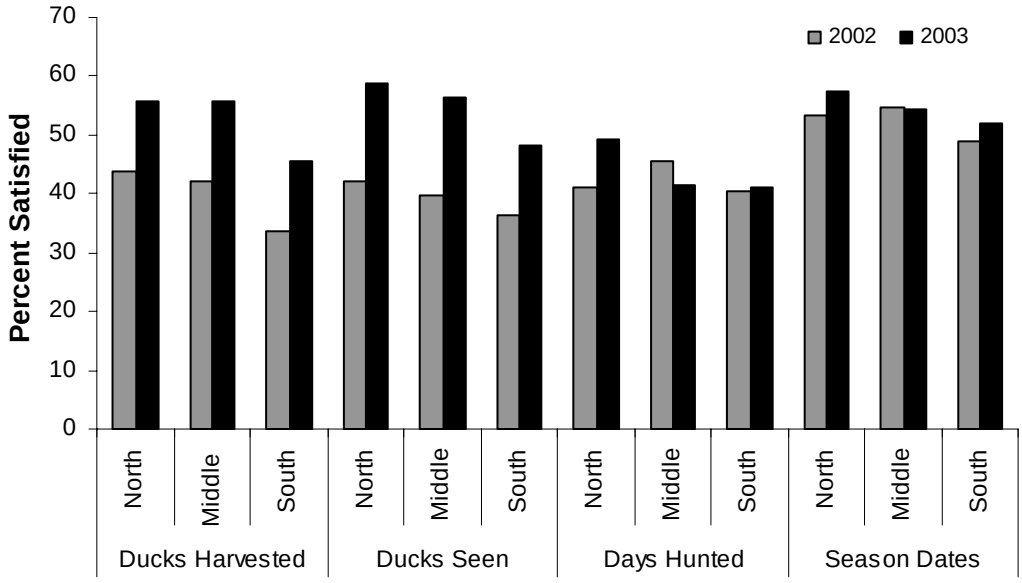
MISSOURI WATERFOWL STATUS, 2004



Hunter Satisfaction with the 2002 and 2003 Waterfowl Seasons

August 2004

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

2003-04 Hunting Season: Fall 2003 was characterized by warm temperatures, dry conditions and poor habitat conditions early, followed by periods of colder temperatures, rain and snow events, and generally improved habitat conditions by late season. Despite early season concerns about availability of water for pumping, most wetland areas had adequate water available for managed flooding. November was the 21st warmest and 24th wettest in the last 109 years with two periods of cold weather occurring between 6-8 November and during the last week of November. Precipitation events improved habitat conditions in late December. In the northern two-thirds of the state, most shallow-water was ice-covered from 10 December through 18 December. December was the 28th warmest and 18th wettest in the last 109 years. Three significant storm systems moved through the Midwest in January. Timely migrations in early season combined with mild conditions late resulted in hunting opportunity throughout the entire 60-day season. Hunting on managed public and private areas was good throughout the season and was good throughout the state in late season when habitat conditions improved.

2003-04 Duck Harvest: Numbers of hunters participating in the 2003-04 season (37,079 vs. 34,822 in 2002-03), trips per hunter (8.4 vs. 7.2 in 2002-03), and average daily success (1.52 vs. 1.67 in 2002-2003) combined to result in a 2003-04 duck harvest of 471,995 up from the previous record of 445,923 in 2001-02 and the harvest of 392,621 in 2002-03. On Department areas, hunters broke the previous record harvest of 65,700 ducks (38,134 trips) set in 2001-02 with a harvest of 77,438 ducks (39,855 trips). Hunters averaged 1.94 ducks per trip, which was slightly higher than last year (1.76), but lower than the high of 2.09 set in 2000. The large harvest was the product of few hunting days limited by weather, and opportunity to hunt much of the 60-day season.

2003-04 Canada Goose Harvest: Canada goose harvest (56,384) was 2nd only to 2000 (76,300) in the last 10 years (Table 3). Approximately 14% of the harvest occurred in the early season (September-early October), 11% from the beginning of duck season until the end of November, and 75% after November 30.

2003-04 Light Goose Harvest: The light goose harvest in Missouri increased from an average of just over 11,000 during the early 1990s (regular hunting season) to a high of 203,200 total light geese (regular season plus Conservation Order) during 2002-2003. During the 2003-04 regular season and the 2004 Conservation Order, hunters harvested 201,300 light geese, second only to 2002.

2004 Breeding Duck Habitat: Reports of above average snowfall during winter 2003-2004 in portions of southern Canada raised expectations of improved wetland habitat conditions. However, dry soil conditions combined with warm, windy weather during April resulted in a poor frost seal and little runoff. As a result, the number of May ponds in Prairie Canada and the northcentral U.S. declined (-24%) from 5.2 million during 2003 to 3.9 million during spring 2004 and was 19% below the long term average. Compared with 2003, there were fewer ponds in Canada (-29%) and the U.S. (-16%) in spite of heavy snowfall in portions of the southern prairies on May 12-13. Precipitation since May improved wetland conditions in portions of central and eastern Prairie Canada, but much of the western prairies remained dry. The July brood production survey was not conducted this year due to USFWS budget constraints, but limited flights over certain areas confirmed reports of improved wetland conditions during June and July. Summer improvements in wetland conditions came too late for initial nesters but should help re-nesters and brood survival.

2004 Breeding Duck Populations: Total duck numbers in the traditional survey area decreased 11% from 36.2 million in 2003 to 32.2 million in 2004, and were 3% below the long-term average. Blue-

winged teal numbers (4.1 million) declined 26% from last year and were 10% below the long-term average. Northern shovelers and American Wigeon were 22% below 2003. Gadwall (+56%), green-winged teal (+33%), and shovelers (+32%) were above their long-term averages. Scaup (-27%), northern pintails (-48%), and American wigeon (-25%) were below their long-term averages. Canvasback were slightly above their long-term average (+10%).

Mallard Fall Flight: The 2004 breeding population estimate for mid-continent mallards of 8.36 million (7.4 million in the traditional survey area plus .93 million in Michigan, Minnesota, and Wisconsin), is similar to the 8.8 million estimate of 2003. The fall flight index for mallards is projected to be 9.4 million, compared to 10.3 million in 2003.

Canada Goose Status: Canada geese that migrate to Missouri include birds from 4 different populations. Tallgrass Prairie Population Canada geese migrate from near the Arctic Circle on Baffin Island, the Eastern Prairie and Mississippi Valley populations originate from west Hudson Bay in northern Manitoba and Ontario, and giant Canada geese nest in more temperate areas including Missouri. Geese from different populations survive, reproduce, and are harvested at different rates. Each population experiences different breeding conditions each year. As a result, population-specific information is needed to assess annual status and to develop appropriate regulations recommendations.

Eastern Prairie Population: The Eastern Prairie Population (EPP) of Canada geese is the predominant migrant population represented in the Missouri goose harvest. A combination of geese observed as singles and in pairs is the basis for decisions about EPP harvest management. The 2004 estimate (145,500 $\pm$ 19,800) is near the 2000 Plan objective of 145,000. However, much of this estimate was comprised of pairs that did not exhibit nesting behavior. Breeding phenology was the latest recorded (1976-2004) and a production "bust" was indicated according to criteria in the 2000 EPP Plan. Based on estimates of nest density, clutch size, and nest success, gosling production at Nestor One was approximately 0.43 per 100 ha of wetland—the lowest productivity recorded from 1976-2004 and well below the average of 33.48 goslings per 100 ha of wetlands observed during that period. We project a fall flight lower than 2003 with few young geese.

Mississippi Valley Population: Spring 2004 was the latest on record for the MVP population. There were 23% fewer nests during 2004, and the average clutch size was the smallest recorded. Reduced nesting effort, low clutch sizes, and cold wet weather during incubation and early brood rearing will contribute to poor production in 2004. A much lower fall flight of MVP Canada geese is expected.

Tallgrass Prairie Population: Tallgrass Prairie Population Canada geese are much smaller than other Canada geese found in Missouri. They nest primarily on Baffin Island and winter in Louisiana, Oklahoma, Texas and northeastern Mexico. Missouri is on the eastern edge of their migration route. Limited information suggests that spring breakup during 2004 was near average but later than 2003. Based upon limited information, production is expected to be somewhat lower than 2003.

Giant Canada Geese: In Missouri, the 2004 survey conducted April 5-9 resulted in a giant Canada goose population estimate of 65,172 (±29,976), similar to the 2003 estimate of 62,806. The population estimate for Missouri increased from 30,300 during 1993 to a high of 77,128 during 2000 but now appears to be leveling off. Canada goose control activities and harvest regulations focusing on giant Canada geese may be beginning to impact the rate of population growth of giant Canada geese in Missouri.

White-Fronted Geese: The 2003 survey yielded 528,200 white-fronted geese in Alberta and Saskatchewan, 17% fewer than the previous year. These results provide a new 3 year (2001-2003) average of 625,900 geese, 22% fewer than the previous mean of 805,700 birds. This is the 4th consecutive year that the fall survey has suggested a decrease in the fall flight. If the fall 2004 survey

continues this trend, harvest regulation adjustments will likely be considered for the 2005 regulations cycle.

Light Geese: Estimates of Mid-continent light geese (Central and Mississippi Flyways) increased to a peak of nearly 3 million during 1998, and since then have declined slightly. The 2004 Midwinter Waterfowl Survey resulted in an estimate of 2.15 million mid-continent light geese, 12% fewer than last year. In Missouri, a total of 467,217 light geese were counted during the 2004 Midwinter survey, 18% fewer than during 2003. A decline in mid-continent light geese since 1998, combined with increasing recovery rates and decreasing survival rates in some areas, hopefully is a signal that population control efforts are beginning to have an impact on numbers of mid-continent light geese.

2004-05 Waterfowl Seasons: Broad frameworks of waterfowl hunting dates, season lengths, and bag limits are developed by the U.S. Fish and Wildlife Service in cooperation with states from each of the 4 flyways – Atlantic, Mississippi (including Missouri), Central, and Pacific. The result of this regulations process is a general waterfowl season framework within which states select specific season dates. States can recommend a season more restrictive but no more liberal than the federal framework. All states within each flyway share a common framework of season length and bag limits; thus, Missouri's basic season structure is the same as the states from Minnesota in the North to Louisiana in the South.

Adaptive Harvest Management: Duck seasons, based on regulatory alternatives developed under the Adaptive Harvest Management Program (AHM), provide for a 60-day season with a 6-duck daily bag limit in 2004-05 for the 8th consecutive year. Each year's regulation recommendation under AHM is based on the status of the mallard breeding population and the condition of prairie ponds in Canada. A 4-tiered package of open seasons, developed in 1997, included liberal (60 days), moderate (45 days), restrictive (30 days), and very restrictive (20 days) options. In 2003, the very restrictive (20 days) alternative was eliminated from the AHM regulations options**.**

Canvasbacks and Pintails: The AHM regulations packages are based upon the status of mallards. When other species, such as pintails or canvasbacks fall below objective levels, special provisions are considered to ensure additional protection. The objective for canvasbacks, to maintain a breeding population of at least 500,000, would not likely be achieved if canvasback hunting was allowed for a full 60-day season. Likewise, pintail numbers have improved from a record low of 1.8 million during 2002 to 2.2 million in 2004, but FWS predictions are that gains this year would be lost if a one-bird bag for pintails was allowed for the full season. Therefore, the allowable season length for pintails and canvasbacks will be only 30 days. We recommend that these days be concurrent with the first 30 days of the duck season, when most hunters participate (including novice hunters), to minimize the number of "mistakes" that could occur.

Goose Frameworks: Frameworks for snow, Ross's, and white-fronted goose seasons have remained unchanged since 2000. A Canada goose season of up to 77 days in 3 segments is designed to provide; 1) greater hunting opportunity and hunting pressure for giant Canada geese produced in Missouri (September and early October); 2) opportunity for concurrent duck and goose hunting; and 3) late season opportunity for migrant Canadas from the Eastern Prairie Population (no more than 30 days after 30 November are allowed in the North and Middle zones), and giant Canada geese from other states. A daily bag limit of 1 during late season is designed to reduce the harvest of Eastern Prairie Population Canada geese in Missouri by 25%, and is in line with proposed reductions in other EPP states.

Spring 2005 Conservation Order: A light goose Conservation Order will be in effect for the 7th consecutive year during spring 2005. The Conservation Order was implemented to reduce numbers of snow and Ross's geese that have rapidly increased in number and are causing damage to portions of the fragile arctic tundra. The Conservation Order will be in effect through April 30, 2005. Lesser snow

(white and blue color phase) and Ross's geese may be taken until ½ hour after sunset, with the use of electronic calls, and with unplugged shotguns during the Conservation Order**.**

Youth Waterfowl Hunting Days: The U.S. Fish and Wildlife Service implemented a youth waterfowl hunting day (in addition to regular hunting season days) for youth under 16 years of age during 1996-99. A 2-day rather than a single-day season was provided beginning in fall 2000 and again will be offered during fall 2004. The youth hunting days (different days are possible in each zone) incorporate a weekend or holidays up to 14 days before or after the regular season. The bag limit is the same as during the regular season. Youth must be accompanied by an adult who is not allowed to hunt ducks but who can participate in other open seasons (e.g., geese). No permits are required for the youth hunters. Nonhunting adults, however, must be licensed unless the youth hunter possesses a valid hunter education certificate card. Only ducks were allowed during 1996-1997; however, geese also could be taken by youth hunters beginning in 1998-2000; the same holds true for 2004.

Motion-wing Decoys (MWD): Efforts to evaluate the use and attitudes regarding MWD were initiated in 2000 and continued through 2004. Field observations, reports from hunters on Department areas, and responses to post-season surveys have provided insights into effectiveness and preferences for future use. MWD use in Missouri appears to have stabilized with 57% of hunters reporting MWD use in 2001 and 2002. On Department wetland areas in 2004, MWD users accounted for 69% of the trips and 74% of the ducks harvested and averaged 2.09 ducks per trip compared to 1.6 ducks per trip for those who did not hunt with one.

Recommending Missouri Seasons: Information for recommending specific waterfowl seasons for Missouri includes migration timing, weather, habitat conditions, and hunters' preferences. Unfortunately, it is impossible to predict in August what these variables will look like in November or December. In the last two years season dates have been shifted later to accommodate hunter preferences, based upon recent year's survey results. Many hunters, however, continue to indicate preferences for even later seasons. We solicited input from 19,700 hunters through 2 different surveys in 2004.

Canada Goose Preferences: While hunter input plays an important role in determining duck hunting season dates, it plays a lesser role in regards to Canada geese. Population status is the primary consideration. Preferences for Canada goose hunting have changed dramatically since the 1980s. Goose hunters are less concerned about having a concurrent duck and goose opener, but 82% still feel it is important to have some days when duck and goose season are both open. A shift in migration patterns of Eastern Prairie Population Canada geese has resulted in later season date preferences. However, 56% of goose hunters indicated that early season hunting opportunity is important

Outlook for the 2004-05 Season: The outlook for 2004 is less optimistic than most recent years. News of dryer wetland conditions, lower breeding duck numbers and a reduced mallard fall flight, combined with prospects of a late spring and poor production in primary Canada goose breeding areas will undoubtedly lower hunter expectations during fall 2004. However, weather, habitat, and migration timing will have a greater impact on the season in Missouri than the size of the fall flight.

MISSOURI WATERFOWL STATUS, 2004

Wetland habitat conditions and waterfowl populations have gone from record low to record high levels during the last decade. Hunting opportunity and harvest also "raised the bar" of hunter expectations. Following is a summary of last year's waterfowl season and the outlook for 2004. The report is divided into 6 primary sections:

1) a review of the 2003-04 hunting season,
2) the status of duck habitat and populations in 2004,
3) the status of goose populations and production,
4) issues affecting hunting regulations in 2004,
5) factors considered when recommending hunting seasons for Missouri,
6) the outlook for the 2004 season.

A more complete summary of waterfowl status is available at:
http://migratorybirds.fws.gov/reports/reports.html

The Missouri waterfowl status report is available on the Missouri Department of Conservation web site at:
http://www.conservation.state.mo.us/hunt/wtrfowl

Throughout the fall / winter this web site provides up-to-date migration and hunting status in Missouri and other waterfowl hunting formation.

We thank the U.S. Fish and Wildlife Service, the Canadian Wildlife Service, other State and Provincial conservation agencies, Missouri Department of Conservation wetland area managers, and Missouri hunters for information used in this report.

2003-04 HUNTING SEASON IN REVIEW

Waterfowl hunting opportunity in Missouri began with the September teal season and continued through January (Table 1). Missouri duck seasons were 60 days in length for the 7th consecutive year in each of the three zones. As in recent years, and in response to hunters' preferences for later seasons, the 2003-04 and 2002-03 season structures were the latest since the 1958 statewide season of 70 days (24 October to 1 January). The South Zone closure of 20 January (21 January in 2002-03) was the 2nd latest among modern duck seasons.

For the 2nd consecutive year Canada goose hunters could hunt for a total of 77 days. The additional days allow for the early season harvest of resident Canada geese without putting

additional pressure on interior populations of Canada geese. As in years past, the Canada goose season structure allowed only 30 days after 30 November in the North, Middle, and Swan Lake Zones. In response to hunter preference for late season hunting opportunity in the Middle Zone, we delayed opening the third segment from 21 December in 2002-03 to 27 December in 2003-04. We will continue to conduct post-season harvest surveys to evaluate hunter season date preferences. The challenge will be to continue to monitor hunters' preferences for seasons and amend seasons based on population status and hunter attitudes.

Table 1. 2003-04 Waterfowl Seasons.

Zone	Youth Hunt	Ducks	Canvasbacks and Pintails	Canada Geese and Brant	White-fronted Geese	Snow/ Blue/ Ross's Geese
NORTH	10/18-10/19	10/25-12/23	10/25-11/23	9/27-10/12 10/25-11/23 12/20-1/18	10/25-1/18	10/25-1/18
MIDDLE	10/25-10/26	11/1-12/30	11/1-11/30	9/27-10/12 11/1-11/30 12/27-1/25	11/1-1/25	11/1-1/25
SOUTH	11/15-11/16	11/22-1/20	11/22-12/21	10/04-10/12 11/22-1/25	11/1-1/25	11/1-1/25
SWAN LAKE	SAME AS NORTH	SAME AS NORTH	SAME AS NORTH	10/25-11/30 12/20-1/18	SAME AS NORTH	SAME AS NORTH
SOUTH-EAST	SAME AS MIDDLE	SAME AS MIDDLE	SAME AS MIDDLE	SAME AS SOUTH	SAME AS SOUTH	SAME AS SOUTH

The Conservation Order for light geese will be in effect from 19 January-30 April, 2004 in the North and Swan Lake Zones, and from 26 January-30 April, 2004 in the Middle, South and Southeast Zones. Snow, blue, and Ross's geese only may be taken during the Conservation Order. Shooting hours are ½ hour before sunrise to ½ hour after sunset during the Conservation Order.

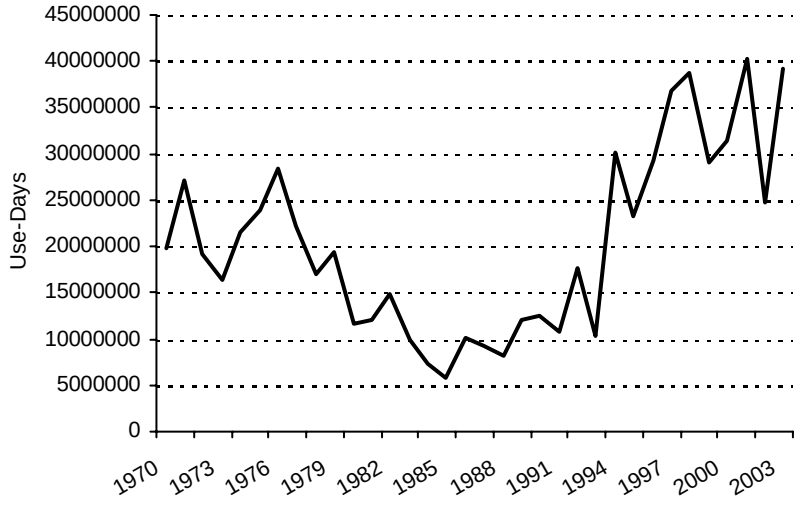
Weather, Habitat and Migrations:

Fall 2003 was characterized by warm temperatures, dry conditions and poor habitat conditions early, followed by periods of colder temperatures, rain and snow events, and generally improved habitat conditions by late season. Despite early season concerns about availability of water for pumping, most wetland areas had adequate water available for managed flooding. Natural food and crop conditions were fair to good on most wetland areas. Timely migrations in early season combined with mild conditions late resulted in hunting opportunity throughout the entire duck season. Hunting on managed public and private areas was good throughout the season and was good throughout the state in late season when habitat conditions improved.

September rains brought moderate relief from very dry conditions experienced throughout the summer in much of Missouri with the exception of Northwest Missouri. October temperatures were slightly above normal and precipitation was slightly below normal. November was the 21st warmest in the last 109 years with two periods of cold weather occurring between 6-8 November and during the last week of November. Precipitation was highly variable in November. Southeast Missouri received 6-7" of rain causing several rivers to exceed floodstage, some portions of Northwest Missouri received 3-5" and other portions less than 1-inch. Overall,

November was the 24th wettest in the last 109 years. Habitat conditions improved greatly in late December. A winter storm moved through Missouri on 10 December and brought much needed precipitation to West, Northwest, and Northcentral Missouri. Moderate rains were followed by colder temperatures and 2"-6" of snow in West Missouri. In the northern two-thirds of the state, most shallow-water was ice-covered from 10 December through 18 December. Temperatures rebounded and during the last week of December much of the state experienced near record temperatures in the 60s. Precipitation was again received on December 22 and 23, with light amounts in the Northwest and Southeast and up to 2" received in some portions of Westcentral and Central Missouri. December was the 28th warmest and 18th wettest in the last 109 years. Three significant storm systems moved through the Midwest in January and brought combinations of rain, freezing rain, sleet, and up to 6" of snow into portions of Missouri. Minimum temperatures dropped below zero over much of northern Missouri on the 5th and 6th which forced many birds from shallow water habitats, or small ponds and lakes, to large rivers and reservoirs. By 7 January most shallow water habitat was ice-covered in Missouri. Temperatures fluctuated around freezing for the remainder of the season in the South Zone. Overall, January precipitation and temperatures were near normal.

Figure 1. Duck Use-days on State & Federal Wetland Areas in Missouri, 1970-2003.



Initial influx of blue-winged teal in August and additional flights during September teal season were consistent with long-term average migration timing. The departure of blue-winged teal and the primary arrivals of early migrant dabblers including gadwalls, pintails, wigeon, and green-winged teal occurred gradually from 9-16 October. Mid-October duck numbers (167,400) were higher than in 2002 (129,500), but lower than 2001 (202,000). A minor migration event on 1 November and a more substantial migration on 6-7 November led to the departure of many early season migrants, the arrival of more mallards, and an overall increase in duck numbers from 167,500 on 21 October to 598,900 on 10 November (compared to 355,200 on 4 November 2002). Minor duck migrations from 12-15 November and a significant migration event on 22-23 November resulted in the highest survey total of the year at 654,400 ducks on 24 November (compared to 370,000 on 18 November 2002). By 8 December 2003, statewide duck numbers dropped slightly to 571,400 (compared to 396,000 on 4 December 2002) with some redistribution of birds from North Missouri to South Missouri. Redistribution of birds from shallow water habitat to remaining open water in North Missouri and from North Missouri to South Missouri continued in mid-December when much of the shallow water habitat in northern Missouri was frozen. However, statewide numbers did not decline (577,900 on 22

December). When shallow water habitat thawed in late December, ducks returned to most state waterfowl areas and federal refuges with the exception of those located in Northwest Missouri. The 2003-04 Midwinter Waterfowl Survey during 5-9 January reflected duck numbers (574,900) substantially higher than 2002-03 (300,000), similar to 2001-02 (589,500), and within the range of the last 20 years (85,700-714,000).

Canada goose numbers continue the decline typical of the last decade. Only 1,175 Canada geese were surveyed at Swan Lake National Wildlife Refuge (NWR) and Fountain Grove Conservation Area (CA) during late October. Numbers decreased to <1,000 until late November when they rose to 1,240 and to a peak of 4,210 on 5 January. Statewide numbers improved in early January with traditional managed areas such as Swan Lake NWR, Fountain Grove CA, Schell-Osage CA, and Montrose CA all having small concentrations of geese. The tally of 126,100 Canada geese in the 2003-04 Midwinter Survey was similar to the total of 132,300 in 2002-03, and lower than 2001-02 (261,500).

The first significant migration of light geese occurred on 6-7 November and then numbers fluctuated throughout November and December. By 10 November, 232,700 light geese were observed in Missouri. Numbers steadily increased in North Missouri until a cold front moved through on 22-23 November. Numbers of light geese at Squaw Creek declined from over 300,000 to less than 50,000. We observed 165,900 light geese on Department areas and national wildlife refuges on 24 November, 347,800 on 8 December, 98,700 on 22 December, and 163,800 on 5-7 January. The overall number of snow geese observed during the 2003-04 Midwinter Waterfowl Survey was 467,200, down from 569,900 in 2002-03, and the record 892,200 observed during the 2001-02 Survey. The number of white-fronted geese observed during the 2003-04 Midwinter Survey (5,100) was similar to last year (5,600), but lower than 2001-02 (12,000).

Duck Harvest:
Mild weather and improved habitat conditions late in the season renewed interest in later duck seasons. Yet, the 60-day season, which spanned 88 days from the 25 October opening in the North Zone to the January 20 closure in the South Zone, included all major duck flights and the range of fall and winter weather conditions. Until precipitation occurred in mid to late December, ducks, hunting opportunity, and harvest were largely limited to traditional managed areas on public and private lands in much of Missouri. Southeast Missouri was the exception, where good habitat conditions existed through most of the season.

Estimates of duck harvest are based on two sources, a U.S. Fish and Wildlife Service (USFWS) survey and the Missouri Department of Conservation Waterfowl Post-season Harvest Survey. Typically, USFWS estimates and MDCs post-season harvest estimates are similar (see Appendix A) and we only report the USFWS estimates. In 2003, the U.S. Fish and Wildlife Service implemented a new survey methodology and their preliminary estimates diverged greatly from our post-season survey estimates, so we report both estimates where possible.

Table 2. Missouri duck harvest (USFWS and MDC Harvest Survey Data).

Year	North Zone *	Middle Zone	South Zone	Statewide
1981-84	122,200** (52.5%)	96,500 (41.5%)	13,900 (6.0%)	232,600
1985-87	86,200 (49.3%)	82,400 (47.1%)	6,400 (3.6%)	175,000
1988-93	55,900 (53.5%)	43,000 (41.2%)	5,500 (5.3%)	104,400
1994-96	109,900 (55.7%)	74,800 (37.9%)	12,500 (6.3%)	197,200
1997	186,800 (51.0%)	142,200 (38.8%)	37,200 (10.2%)	366,200
1998	239,600 (52.3%)	167,100 (36.5%)	51,700 (11.3%)	458,400
1999	200,700 (62.2%)	79,700 (24.7%)	42,200 (13.1%)	322,600
2000	256,500 (56.8%)	98,600 (21.9%)	95,700 (21.2%)	450,800
2001	277,100 (60.1%)	114,500 (24.8%)	69,500 (15.1%)	461,000
2002***	74,700 (34.4%)	129,500 (59.6%)	13,100 (6.0%)	217,300
MDC 2002	--	--	--	392,600
2003***	NA	NA	NA	433,700
MDC 2003	--	--	--	472,000

* 3 zones since 1991 ** mean number and % of statewide harvest *** data are preliminary

Numbers of hunters participating in the 2003-04 season (37,079 vs. 34,822 in 2002-03), trips per hunter (8.4 vs. 7.2 in 2002-03), and average daily success (1.52 vs. 1.67 in 2002-2003) combined to result in a 2003-04 duck harvest of 472,000 (433,700 USFWS estimate) up from the previous record of 445,900 in 2001-02 and the harvest of 392,600 in 2002-03. The large harvest was the product of few hunting days limited by weather, and opportunity to hunt much of the 60-day season. On Department areas, hunters broke the previous record harvest of 65,700 ducks (38,134 trips) set in 2001-02 with a harvest of 77,400 ducks (39,855 trips) (Figure 2). Hunters averaged 1.94 ducks per trip, which was slightly higher than last year (1.76), but lower than the high of 2.09 set in 2000.

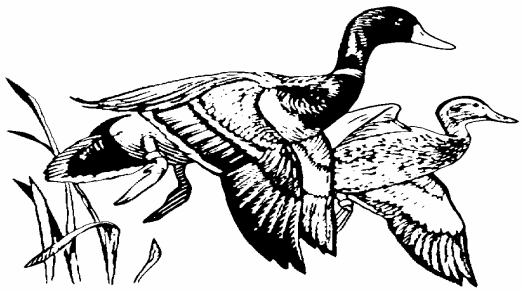
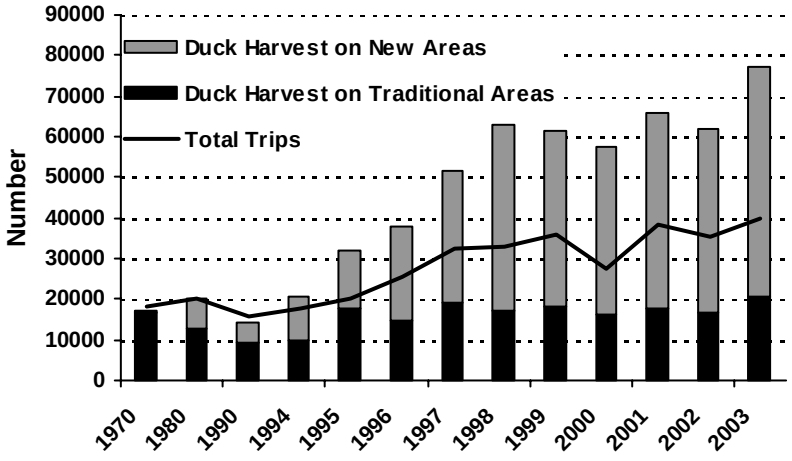


Figure 2. Numbers of Ducks Harvested on Missouri Department of Conservation Areas.



Traditional areas = Fountain Grove, Montrose, Duck Creek and Schell-Osage CAs

Hunters harvest only a small portion of the total number of ducks on Department areas and this proportion has not increased in recent years. The relationship between public area harvest and statewide harvest in 2003-04 (16.4% of a statewide total of 472,000) and 2002-03 (15.8% of a statewide total of 461,100) was similar to the average of 14.4% (range = 12.4-16.5%) from 1988-1997. During dry years, Department areas with water pumping capabilities typically account for a higher proportion of the statewide duck harvest than during wet years. For example, in 1999-00 (a dry season) 19.1% of the statewide harvest occurred on public areas compared to only 13.9% during the wet fall of 1998-99. Duck hunters harvested the most mallards and other duck species during the first two weeks of November (Figure 3). Harvest was high during this period due to a migration event on opening weekend in the Middle Zone and another migration event on 6 November. After a harvest lull in mid-November, it picked up again in association with migration events in late November. Harvest dropped slightly in mid-December when much of the shallow water habitat was ice covered, but improved in late December when temperatures moderated and precipitation improved habitat conditions.

Periods of peak harvest vary according to migration timing and habitat conditions (Figure 3, Figure 4, and Appendices C-E). In 2003, early season cold fronts ushered in substantial numbers of ducks and late season precipitation and moderate weather allowed them to stay throughout the 60-day season. In contrast, dry conditions in 2002 resulted in a decline in late season harvest even though open water was still available. In 2001, peak harvest occurred late due to mild conditions and in 2000 nearly all of the harvest occurred before cold temperatures pushed ducks south in early December. With a 60-day season in place, the periods of greatest harvest opportunity were included in all four years.

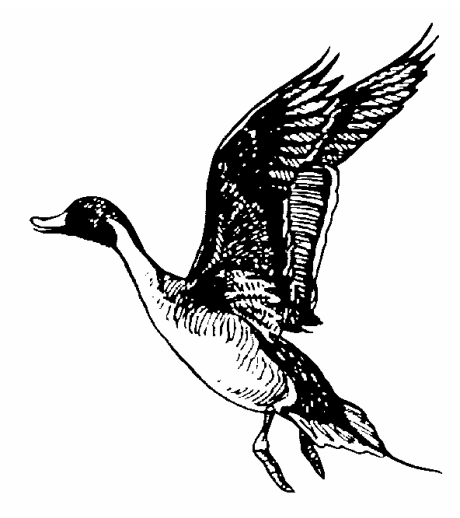


Figure 3. Duck harvest per day by 5-day periods, 2003-2004.

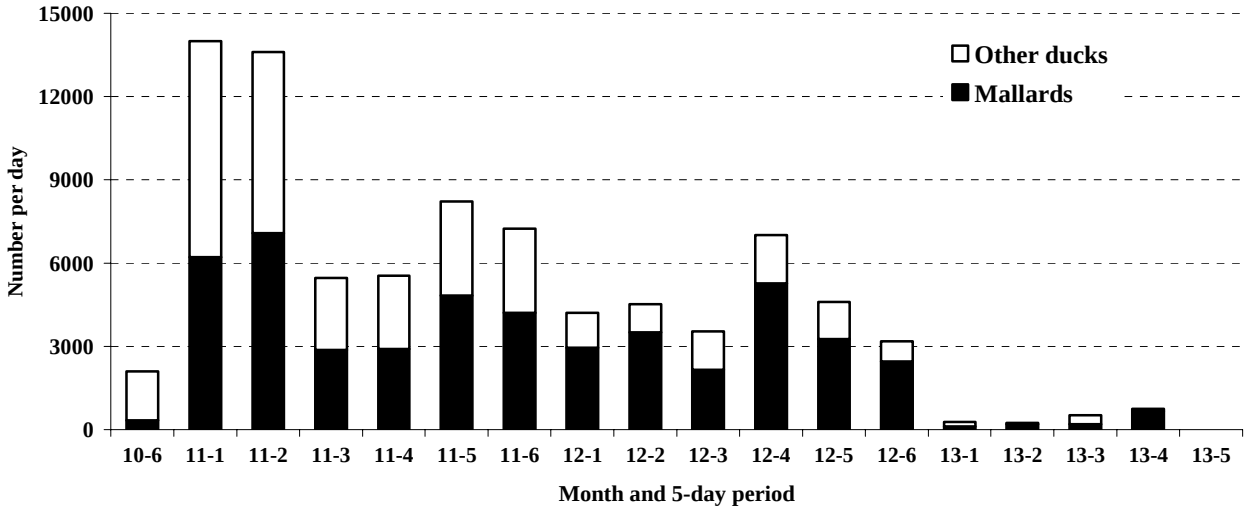
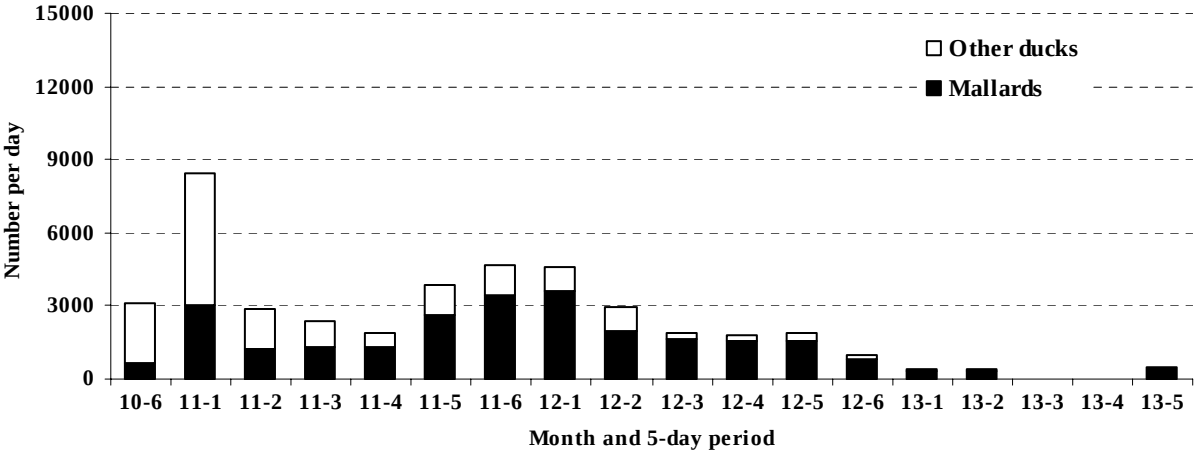


Figure 4. Duck harvest per day by 5-day periods, 2002-3003.



Canada Goose Harvest:

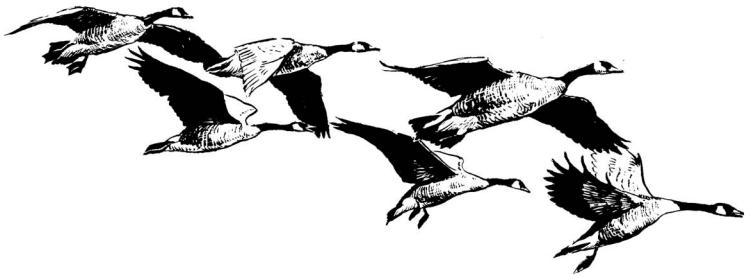
Canada goose harvest (56,384) was 2nd only to 2000 (76,300) in the last 10 years (Table 3). The large harvest was attributed to the migration of Canada geese into Missouri in association with the storm systems that moved through the Midwest in late December and early January. Population size, the number of geese banded, and band recoveries are used to derive the number of geese harvested, by population, from statewide Canada goose harvest estimates. According to these derivations, the proportion of giant Canada geese in the Missouri Canada goose harvest has increased from 14% during 1970-1974 to 80% during 2000-2002. The above estimates include giants produced in other states and harvested in Missouri. Approximately 38% of the statewide

Canada goose harvest is estimated to be comprised of giant Canada geese produced in Missouri. An additional 21% is comprised of giant Canada geese produced in Minnesota.

Table 3. Missouri Canada goose harvest (USFWS Harvest Survey Data).

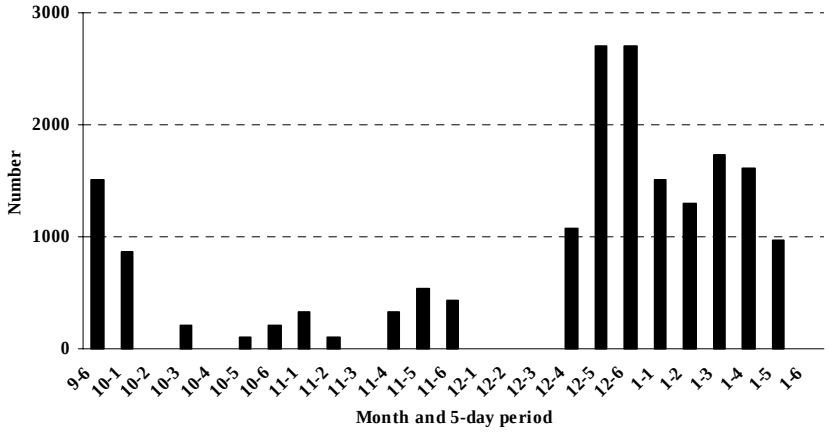
Years	Swan Lake Zone	Southeast Zone	North Zone	Middle Zone	South Zone	Statewide
1970-74	35,100 (81.0%)	1,900 (4.4%)	4,900 (11.3%)	900 (2.0%)	500 (1.2%)	43,300
1975-79	52,700 (78.7%)	6,500 (9.7%)	4,200 (6.3%)	2,800 (4.2%)	700 (1.0%)	66,900
1980-86	27,900 (71.4%)	2,400 (6.1%)	4,400 (11.3%)	4,100 (10.5%)	300 (0.8%)	39,100
1987-89	18,000 (58.8%)	1800 (5.9%)	3,000 (9.8%)	5,800 (19.0%)	2,000 (6.5%)	30,600
1990-92	11,100 (36.6%)	4,700 (15.5%)	7,600 (25.1%)	6,600 (21.8%)	300 (1.0%)	30,300
1993-96	6,900 (15.0%)	7,200 (15.8%)	22,000 (48.3%)	8,500 (18.5%)	1,100 (2.4%)	45,700
1998	300 (1.2%)	2,300 (9.3%)	13,800 (56.1%)	1,600 (6.5%)	6,600 (26.8%)	24,600
1999	700 (2.0%)	2,400 (6.8%)	21,200 (59.7%)	6,100 (17.2%)	5,100 (14.4%)	35,500
2000	1,700 (3.6%)	4,500 (9.6%)	26,800 (56.9%)	7,000 (14.9%)	7,100 (15.1%)	47,100
MDC 2000						76,300
2001	3,100 (4.7%)	0	43,400 (64.3%)	16,000 (23.8%)	5,000 (7.3%)	68,600
MDC 2001						43,900
2002**	3,300 (13.1%)	274 (1%)	14,500 (57.6%)	4,900 (19.5%)	2,200 (8.7%)	25,200
MDC 2002	--	--	--	--	--	44,000
2003	--	--	--	--	--	18,500
MDC 2003	--	--	--	--	--	56,400

* mean number and % of statewide harvest ** Data are preliminary



The pattern of Canada goose harvest was the result of season timing as well as migration patterns. Early season hunting opportunity for giant Canada geese and late migrations into the state accounted for a bimodal appearance to the harvest distribution. The early season (September-early October) Canada goose harvest made up about 14% of the statewide harvest, which was similar to 2002-03 (11%), but lower than the 20% harvested in the early season during 2001 (Figure 5). Approximately 11% (vs. 15% in 2002-03) of the Canada goose harvest took place from the beginning of duck season until the end of November, and 75% (vs. 74% in 2002-03) took place after 30 November.

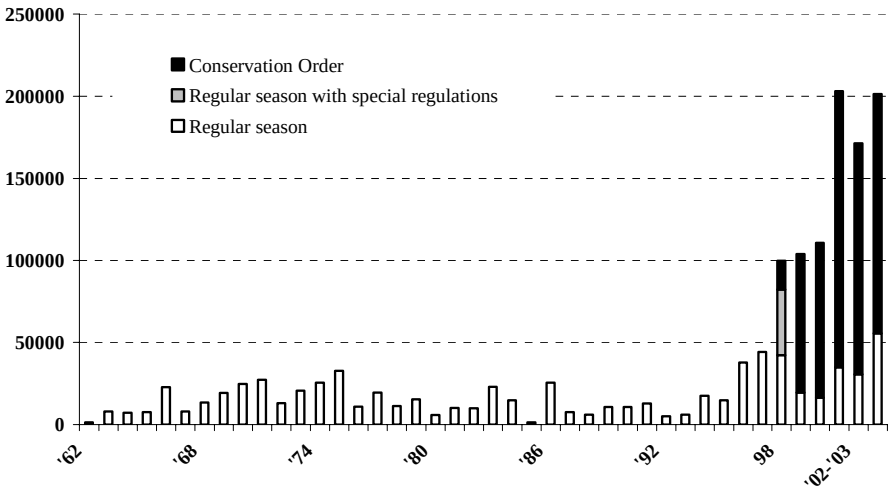
Figure 5. Canada goose harvest by 5-day periods in 2003-04 (FWS Harvest Survey).



Light Goose Harvest:

More liberal light goose hunting regulations after the mid-1990s and the availability of a Conservation Order beginning in February 1999 has resulted in a dramatic increase in the harvest of light geese in Missouri. The light goose harvest increased from an average of just over 11,000 during the early 1990s (regular hunting season) to a high of 203,200 total light geese harvested (regular season plus Conservation Order) during 2001-2002 (USFWS and MDC harvest estimates) (Figure 6). During the 2003-04 regular season, hunters harvested 55,500 snow geese compared to 30,600 in 2002-03. The snow goose harvest during the 2004 Conservation Order (145,800) was similar to 2003 (140,400).

Figure 6. Missouri light goose harvest: 1962-2004.



White-Fronted Goose Harvest:

The harvest of white-fronted geese in the Mississippi Flyway nearly doubled from an average of

about 65,000 during the early 1990s to over 146,000 during 1999. Over 90% of this harvest occurred in the states of Louisiana and Arkansas. In Missouri, the harvest of white-fronted geese is low and unpredictable. The average harvest has dropped from 2,800 white-fronted geese during 1999-2000 to 1,013 during 2001-2003. The primary harvest appears to occur during late season in the Missouri Bootheel.

2004 DUCK AND HABITAT STATUS

Each year, extensive surveys of waterfowl and wetlands are conducted in May and July in primary breeding areas of the U.S. and Canada. Coverage of 1.3 million mi^2 in the spring provides information about breeding populations and the condition of wetlands in the Prairies, northern Canada, and Alaska. July surveys in much of the same area are the source for information about the numbers of ducks produced and the condition of habitat for duck broods.

Numbers of wetlands, termed "May ponds" and "July ponds," reflect habitat conditions for duck pairs in the spring and duck broods in the summer, respectively. Projections of the mallard fall flight are based on historic relationships among breeding duck numbers, habitat conditions, adult survival, and expected fall age ratios and duck numbers. This year, the July survey was not conducted due to budget shortfalls, therefore information about habitat conditions and brood counts during July are limited.

Figure 7. Number of May ponds in the U.S. and Canadian Prairies

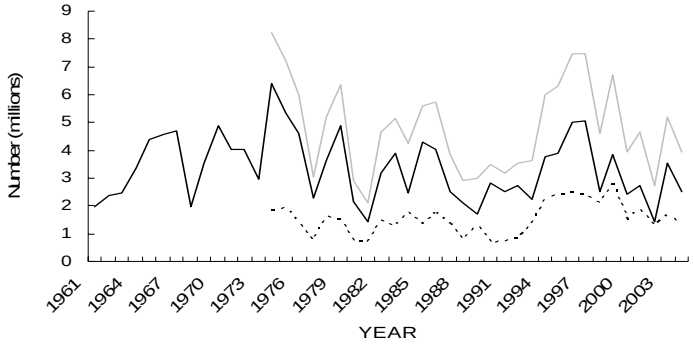


Table 4. Percent change in habitat and population indices from 2003 (03) and the long-term average (LT) among breeding ground regions.

	May Ponds		Breeding Ducks		Mallards	
Region	**vs 03**	**vs LT**	**vs 03**	**vs LT**	**vs 03**	**vs LT**
E. Dakotas	-32%	-20%	+3%	+29%	+4%	+77%
W.Dakotas/MT	+25%	+15%	-7%	0%	-2%	-1%
S. Alberta	-7%	-30%	-7%	-42%	-4%	-46%
S. Saskatchewan	-32%	-26%	-38%	-22%	-24%	-23%
S. Manitoba	+10%	-20%	-7%	-5%	-22%	+5%

Duck Habitat:

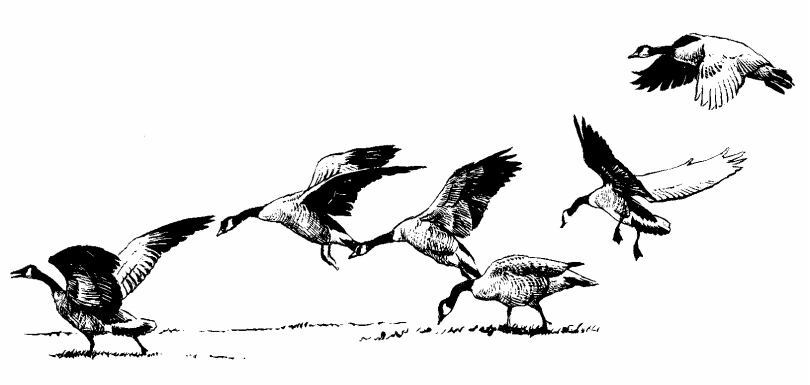
Reports of above average snowfall during winter 2003-2004 in portions of southern Canada raised expectations for improved wetland habitat conditions. However, dry soil conditions combined with warm, windy weather during April resulted in a poor frost seal and little runoff. As a result, the number of May ponds in Prairie Canada and the northcentral U.S. declined (-24%) from 5.2 million during 2003 to 3.9 million during spring 2004 and was 19% below the long-term average. Compared with 2003, there were fewer ponds in Canada (-29%) and the U.S. (-16%) in spite of heavy snowfall in portions of the southern prairies on May 12-13.

Precipitation since May improved wetland conditions in portions of central and eastern Prairie Canada, but much of the western prairies remain dry. The precipitation came too late for initial nesters, but should help re-nesters and should improve brood survival. Overall, production from southern Saskatchewan and Alberta is expected to be only fair to poor. The July brood production survey was not conducted this year due to USFWS budget constraints, but limited flights during July over certain areas confirmed reports of improved wetland conditions due to rain that came after the May survey. Although recent rains may improve habitat status going into fall, several years of wet growing seasons are needed for vegetation to reach optimal conditions for breeding waterfowl.

Duck Populations:
Total duck numbers in the traditional survey area decreased 11% from 36.2 million in 2003 to 32.2 million in 2004, and were 3% below the long-term average. Duck numbers were generally down in southern Canada (S. Alberta -7%, S. Sask.-38%, S. Manitoba -7%) but increased by 15% in northern Saskatchewan, northern Manitoba, and western Ontario. Increases in northern areas are often noted when the southern prairies are dry. Blue-winged teal numbers (4.1 million) declined 26% from last year and were 10% below the long-term average. Northern shovelers and American Wigeon were 22% below 2003. Gadwall (+56%), green-winged teal (+33%), and shovelers (+32%) were above their long-term averages. Northern pintails (-48%), American wigeon (-25%) and scaup (-27%) were below their long-term averages. Canvasbacks were slightly above their long-term average (+10%).

Mallard Fall Flight: The 2004 breeding population estimate for mid-continent mallards of 8.36 million (7.4 million in the traditional survey area plus .93 million in Michigan, Minnesota, and Wisconsin), is similar to the 8.8 million estimate of 2003. The fall flight index for mallards is projected to be 9.4 million, compared to 10.3 million in 2003.

2004 GOOSE STATUS



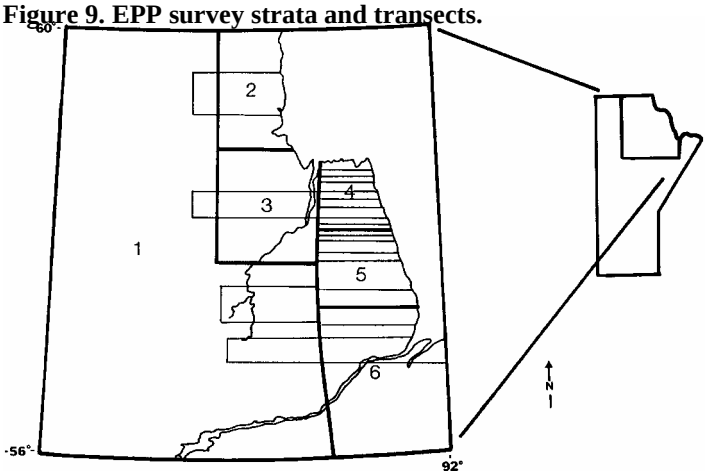
Canada geese that migrate to Missouri include birds from 4 different populations. Tallgrass Prairie Population Canada geese migrate from near the Arctic Circle on Baffin Island, the Eastern Prairie and Mississippi Valley populations originate from west Hudson Bay in northern Manitoba and Ontario, and giant Canada geese nest in more temperate areas including Missouri. Geese from different populations survive, reproduce, and are harvested at different rates. Each population experiences different breeding conditions each year. As a result, population-specific information is needed to assess annual status and to develop appropriate regulations recommendations.

Eastern Prairie Population:

The Eastern Prairie Population (EPP) of Canada geese nests in Northern Manitoba and primarily migrates/winters through Manitoba, Minnesota, Iowa, Missouri, and Arkansas (Figure 8). An EPP objective of 200,000 geese was approved by the Mississippi Flyway Council in March 2000 (MFTS 2000). Harvest strategies from the 2000 Plan, however, are not based on the 200,000 total population objective. Instead, harvest management recommendations are based only on the number of geese represented by singles and pairs in the population (145,000 objective). Annual regulations and management decisions are based on plan objectives and results from the EPP breeding ground survey and from ground-based nesting and production surveys conducted near Cape Churchill, Manitoba.

Figure 8. EPP range and migration areas.

Figure 9. EPP survey strata and transects.



Surveys of the EPP have been conducted since 1972 and reflect population and nesting effort (Figure 9). Geese observed on the survey consistently have been recorded as singles, pairs, groups, and numbers of geese per group, and singles or pairs with nests or broods. Estimates of numbers of geese among these components reflect changing EPP composition among years.

Breeding phenology in 2004 was the latest recorded (1976-2004). As a result, the aerial survey was conducted much later than normal, 16-20 June, by Brian Lubinski (USFWS, pilot), Paul Telander (Minnesota DNR, observer), and Andrew Raedeke (Missouri DOC, observer). A Partenavia PN-68 Observer was used for the 20th consecutive year. May 2004 temperatures were the coldest among survey years (1972-2004) with an average daily temperature of -8.1°C compared to 3.4°C in 2003 and the 1972-2004 average of -0.7°C. Cold temperatures contributed to late snow melt and late nesting phenology. Heating-degree days in May (807, Figure 10) surpassed the previous high among survey years of 802 heating degree days recorded in May 1983, and nearly doubled the number of heating degrees in May 2003 (457) (Figure 11). Range-wide vegetation, snow and ice conditions all indicated a late spring. Cape Churchill was 50% snow covered as late as 16 June (D. Andersen, pers. Comm.). At the

time of the survey, most large lakes remained at least partially ice covered in the northern reaches of the EPP range and only the most southerly portions were completely ice free. Extensive snow drifts were present on the lee side of willow, alder, and spruce stands, with slightly better conditions existing in the interior and in the southern portion of the EPP range. No vegetation had leafed out with the exception of the south where some sedge was beginning to show green in a few isolated locations. Coastal portions of the range were wetter than normal as a result of above average snow and the interior was normal to slightly below normal (R. Romaniuk, pers. comm.). Interior lakes and streams were at normal levels and smaller streams near the coast were at or above flood-stage.

Figure 10. Heating degree days during May 2003 & 2004, vs. normal.

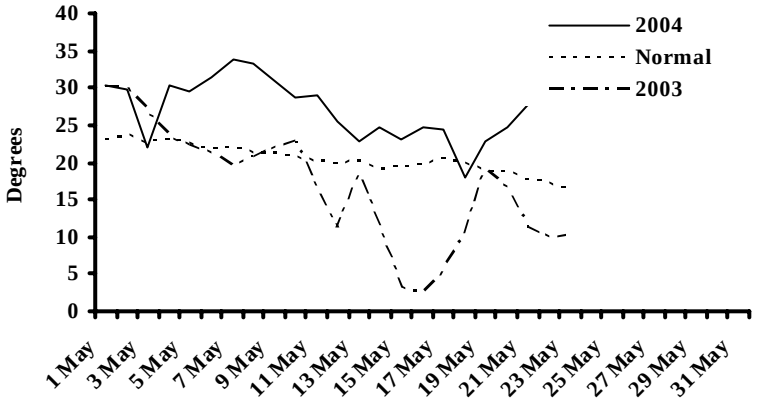
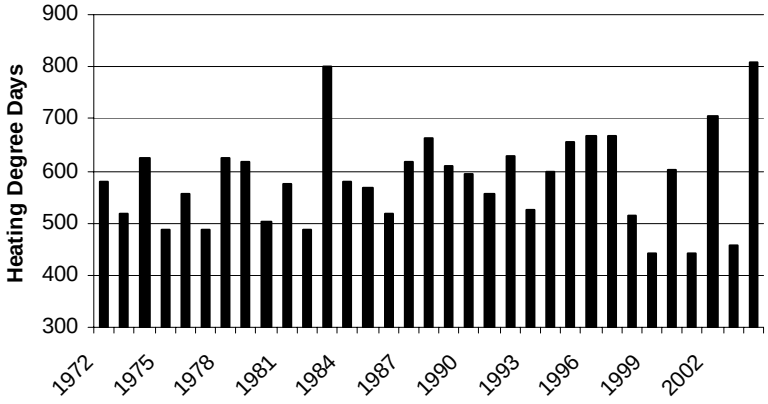


Figure 11. May heating degree days by year at Churchill, Manitoba.

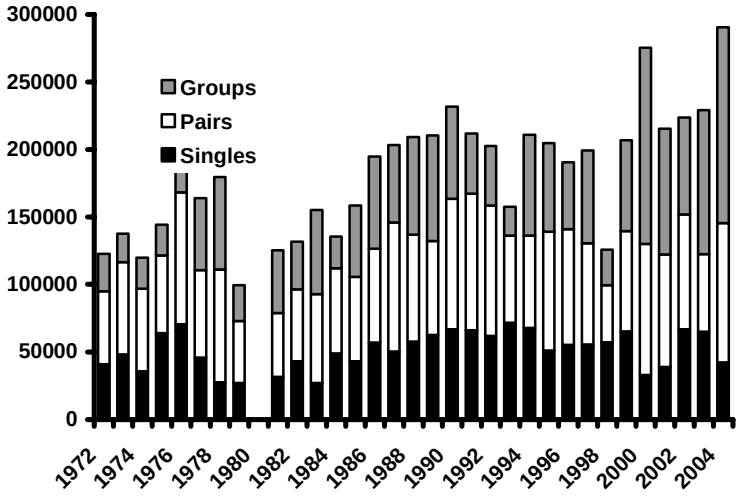


Total EPP: The 2004 EPP estimate of 290,700 ± 36,800 geese was higher (P=0.016, 2-tailed Z test) than the estimate in 2003 (229,200 ± 33,500), and exceeds the EPP Plan objective of 200,000 geese. (Figure 12).

Geese in groups: The estimate of 145,200 ± 32,300 geese in groups was similar (P=0.087) to the 2003 estimate of 106,800 ± 29,700, and similar to most estimates in the past 5 years (Figure 12). Grouped geese accounted for 50% of the EPP population in 2004 compared to the range of 32-53% from 2000-2003 and 15-37% from 1972-1999. The influence of molt migrant giant Canada geese continues to confound interpretation of breeding ground survey results. The late timing of this year's survey likely increased the presence of molt migrant geese. The coastal estimate (90,900 ± 26,300) was similar to the record high of 82,500 ± 28,100 in 2003 (P=0.670) and the interior estimate increased from 24,300 ± 9500 in 2003 to 54,300 ± 18,700 (P=0.005).

Based on guidelines in the 2000 EPP Plan, larger groups in interior strata (>15 geese/group – most likely giant Canada geese or interior Canada geese from other populations, e.g., MVP, SJBP) were excluded from EPP estimates. Five groups >15 were observed in interior habitats in 2004 (20, 24, 25, 28, and 36, excluded from EPP estimate).

Figure 12. Numbers of EPP geese represented by singles, pairs, and groups.



Singles: The extremely late nesting season in 2004 resulted in lower (P=0.001) numbers of single geese (41,900 ± 7,300) compared to 2003 (64,800 ± 10,700). The 2004 estimate was more reminiscent of the period from 1977-1985 when estimates of singles ranged from 26,900 ± 6,300 to 48,600 ± 8,500. The extent of decline from 2003 was similar in coastal and interior habitats with a decline from 32,600 ± 7,000 to 20,400 ± 3,800 (P=0.002) in the coastal strata and from 32,200 ± 8,200 to 21,500 ± 6,300 (P=0.045) in the interior strata.

Pairs: The estimate of 103,600 ± 16,200 geese in pairs was higher (P<0.001) than 2003 (57,600 ± 11,200), but similar to estimates in 1976, 1987, 1990, 1991, 1992, and 2000. In the coastal strata, the estimate of geese in pairs increased from 32,200 ± 7,500 in 2003 to 55,100 ± 12,000 (P=0.002), and in the interior strata from 25,300 ± 8,200 to 48,500 ± 11,000 (P=0.001).

Singles and pairs: A combination of geese observed as singles and in pairs is the basis for decisions about EPP harvest management. Pairs plus singles likely include geese actively nesting in the current year as well as those likely to nest in the near term. This year's estimate of 145,500 ± 19,800 is near the 2000 EPP Plan objective of 145,000, similar (P=0.091) to last year's estimate of 122,400 ± 18,100, and similar to the 2002 estimate of 152,000 ± 19,100. The 2004 coastal estimate (75,400 ± 14,500) was similar to the 1986-2002 average (68,800 ± 13,300), as was the interior estimate (70,100 ± 13,500 vs. 1986-2002 average, 69,800 ± 12,600).

Productive Geese: We believe numbers of geese nesting are best reflected by a combination of single geese, pairs seen with nests or broods, and geese initially observed as a single (e.g., goose flushed from a nest) and joined by another bird (likely the gander). "Productive geese" do not include pairs that are not seen associated with a nest or brood. Numbers of productive geese declined from 70,700 ± 11,400 in 2003 to 48,100 ± 7,900 (P=0.001), the lowest level since 1984 when this metric was first tallied, with the exception of 2000 (40,800 ± 7,900). The decline was the most pronounced in the coastal habitat where numbers of productive geese dropped from 38,000 ± 7,800 to 23,700 ± 4,300 (P=0.003). Numbers of productive geese in the interior habitat were similar in 2004 and 2003 (24,300 ± 6,600 in 2004 vs. 32,700 ± 8,200 in 2003, P=0.097).

The 2004 estimate of 2,200 ± 1,100 nests points toward a poor production year. Nesting effort also is indicated by the count of nests observed during transects (32 in 2004, 44 in 2003, 126 in 2002, 81 in 2001, and 57 in 2000) and during low-level surveys near the Hudson Bay coast (n=21, 0.37 nests/mile in 2004 vs. 0.58/mile in 2003 vs. 1.0/mile in 2002 vs. 0.65/mile 1991-2003 average). Average clutch size near the Hudson Bay coast (2.69 eggs vs. 3.86 1981-2003 average) was the lowest recorded (1979-2004).

Survey Results and Hunting Regulations: The harvest management objective for the EPP is "to provide sustained hunting opportunity and harvest of EPP Canada geese that are consistent with the 1988-97 average population of 200,000 geese (145,000 geese represented by pairs and single geese)" and will be implemented according to the following strategies and population thresholds:

> **Breeding ground estimate of singles and pairs between 120,000 and 170,000:** Implement regulations for EPP harvest similar to those in 1993-94 (the season during 1993-94 was the 25% reduction season from the 1992 EPP Plan).
>
> **Breeding ground estimate of singles and pairs between 95,000 and 120,000:** Implement regulations that will result in a 25% reduction in EPP harvest until the breeding population reaches or exceeds 132,500 birds.
>
> **Breeding ground estimate of singles and pairs at or below 95,000:** Implement regulations that will result in a 50% reduction in EPP harvest until the breeding population reaches or exceeds 132,500 birds.
>
> **Breeding ground estimate of singles and pairs exceeds 170,000:** Implement regulations to allow a 25% increase in EPP harvest until the breeding population reaches 145,000. An increase in harvest opportunity may not be considered if a production bust is indicated.
>
> **Production bust indicated:** Implement regulations that will result in the next lower level of harvest reduction for the bust production year. Harvest restrictions also will be factored into recommendations if a bust in production occurs during years when the EPP is above 170,000 or below 95,000. Poor production will be indicated by: 1) >625 heating degree days in May at Churchill, Manitoba, and 2) no nests initiated by May 23 at Cape Churchill, Manitoba.

From 2001-2003, EPP numbers were near the 2000 EPP Plan threshold criteria for more restrictive regulations (120,000 singles and pairs). The 2004 estimate (145,500 $\pm$ 19,800) is near the 2000 Plan objective of 145,000. However, much of this estimate was comprised of pairs that did not exhibit nesting behavior. Breeding phenology was the latest recorded (1976-2004) and a production "bust" was indicated according to criteria in the 2000 EPP Plan. In 2004, May heating degree days (807) were above the 625 heating degree days threshold indicated in the 2000 EPP Plan and geese did not initiate nesting at Cape Churchill until 4 June, well after the threshold of 23 May (D. E. Andersen, pers. comm.). Furthermore, all indexes from Nestor One indicate that 2004 will likely yield the lowest productivity recorded for Canada geese at Cape Churchill (1976-2004). The study crew observed the lowest density of Canada goose nests (0.82 per 100 ha vs. the 1994-2003 average of 5.7 per 100 ha), the smallest clutch size (2.2 vs. the

1994-2003 average of 4.0), and the latest expected median hatch date (11 July vs. the 1994-2003 average of 24 June) at Cape Churchill (D. E. Andersen, pers. comm.). We project a fall flight lower than 2002, potentially with few young geese.

Mississippi Valley Population:
Spring 2004 was the latest on record for the MVP population. Although the total population estimate of 726,979 represents a 27% increase from 2003, this count was likely inflated by the presence of molt migrating giant Canada geese from the south. There were 23% fewer nests during 2004, and the average clutch size was the smallest recorded. Reduced nesting effort, low clutch sizes, cold wet weather during incubation, and early brood rearing will contribute to poor production in 2004. A much lower fall flight of MVP Canada geese is expected.

Tallgrass Prairie Population:
Tallgrass Prairie Population Canada geese are much smaller than other Canada geese found in Missouri. They nest primarily on Baffin Island and winter in Louisiana, Oklahoma, Texas and northeastern Mexico. Missouri is on the eastern edge of their migration route. Because they nest in the high arctic, production is often affected by weather and late snow melt. Limited information suggests that spring breakup during 2004 was near average but later than 2003. Lower clutch sizes were found in a sample of nest searches. Based upon this limited information, production is expected to be somewhat lower than 2003. Surveys and banding conducted during August will provide up-to-date information on the status of this population.

Giant Canada Geese:
Giant Canada geese are native to prairie portions of the Upper Midwest and they were common in portions of Missouri during pre-settlement times. Giant Canada geese were thought to have become extinct by the late 1800s but have now been restored to most of the eastern U.S.

Table 5. Estimated spring population of giant Canada geese in the Mississippi Flyway and Missouri.

Year	Mississippi Flyway	Missouri
1993	810,900	30,300 (± 18,000)
1994	1,002,950	35,050 (±19,400)
1995	1,030,600	32,200 (±14,200)
1996	1,132,354	38,870 (±19,530)
1997	1,038,677	41,020 (±22,860)
1998	1,214,798	44,825 (±8,816)
1999	1,234,096	56,750 (±10,987)
2000	1,497,444	77,128 (±27,710)
2001	1,370,967	50,517 (±14,934)
2002	1,612,349	64,222 (±24,045)
2003	1,631,003	62,806 (±19,519)
2004	1,582,200	65,172 (±29,976)

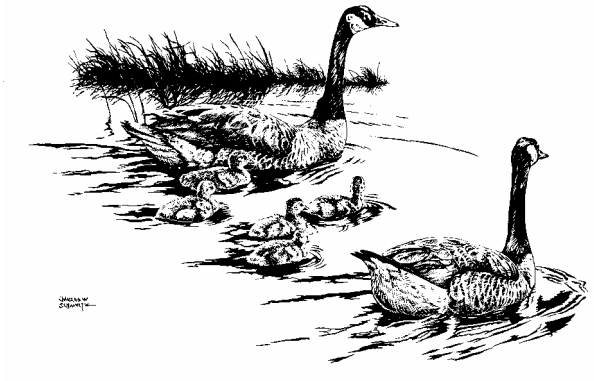
A cooperative breeding population survey was developed and has been implemented in at least 6 Mississippi Flyway states since 1993. This survey requires the use of helicopters to conduct low level counts on randomly selected 2 mi^2 plots. Additional states cooperate in the survey using

fixed wing aircraft, ground counts, or extrapolations from known density areas to habitats in non-surveyed areas. An initial Mississippi Flyway estimate of 810,900 giant Canada geese in 1993, increased to a high of 1.63 million by spring 2003. The spring 2004 estimate of 1.5 million is similar to the estimates of the past two years (Table 5). These estimates are considered conservative due to the inability to survey some urban locations. In Missouri, the 2004 survey was conducted during 5 days from April 5-9, resulting in a giant Canada goose population estimate of 65,172 (±29,976), similar to estimates of 62,806 and 64,222 during 2003 and 2002, respectively. The population estimate increased from 30,300 during 1993 to a high of 77,128 during 2000 but appears to have leveled off since (Table 5). Canada goose control activities and harvest regulations focusing on giant Canada geese appear to be impacting the rate of population growth of giant Canada geese in Missouri.

Table 6. Results of the 2004 giant Canada goose survey in Missouri.

Strata	# Plots	geese/plot	Prs	PN	S	SN	Groups	Total	Est. geese
High	10	5.5	12	1	8	1	20	55	4,637
Medium	29	4.3	27	12	8	1	39	126	19,348
Low	91	1.8	30	16	12	1	85	190	41,187
Total	130		69	29	28	3	144	371	65,172

A total of 150 random 2-square mile plots were selected to be surveyed and 130 were flown requiring 36.5 helicopter hours. Ninety-one, 29, and 10 plots were flown in low, medium and high density strata, respectively. Selected but not flown were a total of 19 low density plots; 16 because no water was identified on the topographic map and three were too far for the time and fuel to allow. One medium density plot was not flown because it was too far for the time and fuel to allow. The 16 plots with no water were assumed to have zero geese and were included in the estimate as if they were flown but no geese were present.



A summary, by strata, of the area and number of plots flown, and the break-down by breeding status (pairs, pairs w/nests, singles, singles with nests, and geese in groups) is shown in Table 6. The mean number of geese observed per plot was 5.5, 4.3, and 1.8 for high, medium and low density plots, respectively. The estimated (expanded) number of geese present for each stratum is also shown in Table 6. Not selected for survey was an area of 6,347 potential plots in the forested hills of southeast Missouri where few or no geese are known to be present.

Banding: Canada goose roundups were conducted in eight general locations during June, 2004, and a total of 3,930 geese were captured. Of these, 2,048 were banded and released, and band numbers on 1,882 “recaptures” were recorded before they were released. The ratio of immature to adults was 0.21.

Table 7. Results of Canada goose roundups in Missouri – June, 2004.

Area	Banded & Released				Total Banded	Retakes	Total Captured
	AM	AF	LM	LF			
St. Louis *	187	151	50	115	503	458	961
Taneycomo	75	46	41	28	190	288	478
Bull Shoals	1	0	7	10	18	16	34
Pony Express	76	85	20	20	201	406	607
Central MO	88	53	113	128	382	237	619
Smithville Lake	153	125	28	32	338	449	787
Southeast MO	15	10	33	32	90	24	114
Kansas City	131	170	10	15	326	4	330
Total	726	640	302	380	2,048	1,882	3,930

* Banding totals does not include 2 of unknown age and sex

Giant Canada Goose Control Activities: Canada goose population control activities were conducted for the 4th year under a Special Purpose Canada Goose Permit issued to the Missouri Department of Conservation (MDC). This permit allows MDC to issue "sub-permits" to private citizens (who have suffered property damage by Canada geese) to destroy nests, to carry out lethal control of adult Canada geese, and to transport hatching year birds to a designated location to be released.

A total of 699 nests (3,655 eggs) were treated to prevent recruitment into the local population and a total of 435 adult geese were destroyed. Adult geese were transported to a meat processing plant to be donated to a food bank. Seventy-seven hatching year birds were transported from damage sites to a rural location and released. Results of damage control activities during 2004, compared with past years, are shown below.

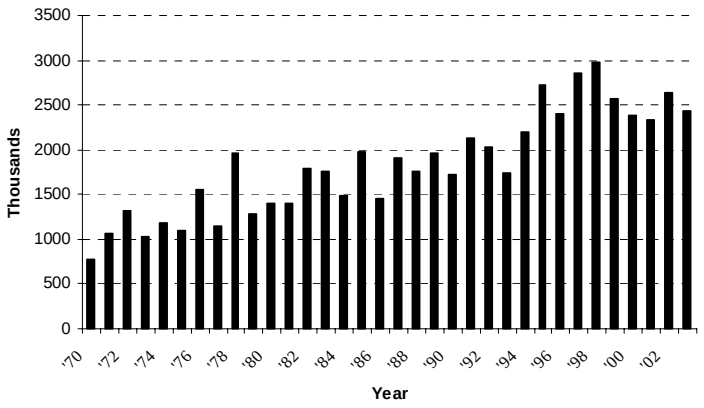
Table 8. MDC 2004 goose permits - total by region.

Region	Eggs Destroyed	Nests Destroyed	Geese Destroyed	Geese Relocated
Northwest	82	16	0	0
Northeast	8	1	2	0
Kansas City	1,193	235	316	16
St. Louis	1,691	322	74	53
Southwest	103	22	3	0
Ozark	-	-	-	-
Central	504	89	40	8
Southeast	74	14	0	0
2004 Total	**3,655**	**699**	**435**	**77**
Previous years Totals				
2003 Totals	4,434	832	525	48
2002	4,289	802	464	68
2001	3,885	772	262	64

White-Fronted Geese:
The Mid-continent Population of greater white-fronted geese nests across a broad region of the arctic from Alaska to the Foxe Basin. They concentrate in southern Saskatchewan and Alberta during migration and winter primarily in Texas, Louisiana, and Mexico. The 2003 fall inventory of mid-continent white-fronted geese was conducted in Alberta and Saskatchewan from September 25 - October 1. The 2003 survey yielded 528,200 white-fronted geese in Alberta and Saskatchewan, 17% fewer than the previous year. These results provide a new 3-year (2001-2003) average of 625,900 geese, 22% fewer than the previous mean of 805,700 birds. Overall, production of white-fronted geese is expected to be somewhat lower than 2003. This is the 4th consecutive year that the fall survey has suggested a decrease in the fall flight. If the fall 2004 survey continues this trend, harvest regulation adjustments will likely be considered for the 2005 regulations cycle.

Light Geese:
The term light geese includes snow (blue and white color phase) and Ross's geese. Breeding colonies on Baffin and South Hampton Island and along the west coast of Hudson Bay are the primary sources of lesser snow geese present in Missouri during fall through winter. However, light geese from throughout the arctic may be present especially during spring migration. Although lesser snow geese are more common, increasing numbers of Ross's geese have been noted in Missouri and the Mississippi Flyway in recent years. This appears to be due to an increase in numbers of Ross's geese throughout their range and to increased numbers of nesting Ross's geese in the eastern arctic. Weather during spring 2004 was highly variable over much of the arctic and goose production may vary greatly depending upon the location of the breeding colony. Goose arrival and nesting were likely delayed by snow cover near Hudson Bay. This may have affected clutch sizes and overall nesting effort on northern areas.

Figure 13. Numbers of mid-continent light geese counted during the Midwinter Survey.



The 2004 Midwinter Waterfowl Survey resulted in an estimate of 2.15 million mid-continent light geese, which is 12% fewer than last year. After peaking at nearly 3 million in 1998, the light geese population appears to have declined by about 2% per year. In Missouri, a total of 467,217 light geese were counted during the 2004 Midwinter survey, 18% fewer than during 2003. A decline in mid-continent light geese since 1998, combined with increasing recovery rates and decreasing survival rates in some areas, hopefully is a signal that population control efforts are beginning to have an impact on numbers of mid-continent light geese.

2004-05 WATERFOWL SEASONS

Broad frameworks of waterfowl hunting dates, season lengths, and bag limits are developed by the U.S. Fish and Wildlife Service in cooperation with states from each of the 4 flyways – Atlantic, Mississippi (including Missouri), Central, and Pacific. A series of technical meetings, administrative review, and public comment are documented in the Federal Register and provide the forum for biological and social considerations. The result of this regulations process is a general waterfowl season framework within which states select specific season dates. States can recommend a season more restrictive but no more liberal than the federal framework. All states within each flyway share a common framework of season length and bag limits; Missouri's basic season structure is the same as the 14 Mississippi Flyway states from Minnesota in the North to Louisiana in the South.

Adaptive Harvest Management:
Duck seasons, based on regulatory alternatives developed under the Adaptive Harvest Management Program (AHM) provide for a 60-day season with a 6-duck daily bag limit in 2004-05 for the 8th consecutive year. AHM is a process implemented in 1995, that provides a framework for making harvest regulation decisions with incomplete knowledge of mallard population dynamics (response to harvest, and to habitat) and about certain environmental variables (wetland conditions). Development of regulations under AHM requires agreeing on a harvest management objective and a limited number of regulations options (currently 3 packages), and formulating specific models of relationships between harvest and populations.

The AHM protocol has been based solely upon the status of mid-continent mallards. Protection of other species that are below objective levels is provided through other provisions, such as limiting the number of days within the overall season framework (such as pintails and canvasbacks). A current challenge for AHM is to incorporate other species into the AHM decision-making process.

Each year, the status of populations and habitat conditions are primary considerations when duck seasons are recommended. For 2004, even though wetland conditions are below the long-term, average numbers of breeding mallards still resulted in the recommendation of a liberal 60-day season for 2004-05. For more specific information about Adaptive Harvest Management refer to the U.S. Fish and Wildlife Service web page at:

http://migratorybirds.fws.gov/mgmt/ahm/ahm-intro.htm

Table 9. Duck season options in the Mississippi Flyway .

Regulation	Restrictive	Moderate	Liberal
Season Length	30 days	45 days	60 days
Duck Bag Limit	3 ducks	6 ducks	6 ducks
Mallard Bag Limit	2 (1)	4 (1)	4 (2)

* A closed season is an option each year.

Canvasbacks and Pintails:
The objective for canvasbacks to maintain a breeding population of at least 500,000 would not likely be achieved if canvasback hunting was allowed for a full 60-day season. Likewise, pintail

numbers have improved from a record low of 1.8 million during 2002 to 2.2 million in 2004, but recent gains would likely be lost if a one-bird bag for pintails was allowed for the full season. Therefore, the allowable season length for pintails and canvasbacks will be only 30 days. We recommend that these days be concurrent with the first 30 days of the duck season, when most hunters participate (including novice hunters), to minimize the number of "mistakes" that could occur.

Goose Frameworks:
A Canada goose season of up to 77 days in 3 segments is designed to provide; 1) greater hunting opportunity for giant Canada geese produced in Missouri (September and early October); 2) opportunity for concurrent duck and goose hunting; and 3) late season opportunity for migrant Canadas from the Eastern Prairie Population (no more than 30 days after 30 November are allowed in the North and Middle zones), and giant Canada geese from other states. A daily bag limit of 1 during late season is designed to reduce the harvest of Eastern Prairie Population Canada geese in Missouri by 25%, and is in line with proposed reductions in other EPP states.

Conservation Order:
A light goose Conservation Order will be in effect for the 7th consecutive year during spring 2005. The Conservation Order was implemented to reduce numbers of snow and Ross's geese that have rapidly increased in number and are causing damage to portions of the fragile arctic tundra. The Conservation Order will be in effect through April 30, 2005. Lesser snow (white and blue color phase) and Ross's geese may be taken with the use of electronic calls, unplugged shotguns, and shooting until ½ hour after sunset**.** A valid Missouri Migratory Bird Hunting Permit ($6) is the only permit required for residents and nonresidents to participate in the Conservation Order. There is no daily bag or possession limit during the Conservation Order.

Youth Waterfowl Hunting Day:
The U.S. Fish and Wildlife Service implemented a youth waterfowl hunting day (in addition to regular hunting season days) for youth under 16 years of age in 1996-99. A 2-day rather than a single-day season was provided beginning in fall 2000 and again will be offered this fall. The youth hunting days incorporate a weekend or holidays up to 14 days before or after the regular season. The bag limit is the same as during the regular season.

Youth must be accompanied by an adult who is not allowed to hunt ducks but who can participate in other open seasons (e.g., geese). No permits are required for the youth hunters. Nonhunting adults, however, must be licensed unless the youth hunter possesses a valid hunter education certificate card. Only ducks were allowed during 1996-1997; however, geese also could be taken by youth hunters beginning in 1998-2000; the same holds true for 2004.

Information for Waterfowl Management:
Waterfowl hunters are a critical component in annual efforts to manage migratory birds. Bands reported by hunters and responses to surveys represent the primary sources of information about harvest and hunter attitudes that are used each year to manage these resources and to recommend hunting seasons that accommodate hunting preferences.

Accurate and precise harvest and hunter estimates require that a complete and representative

sampling frame is available. Hunters can help by prompting license vendors to ask and record information about the previous year's hunting activity. The questions asked by vendors are not designed to estimate harvest; they are too general to be used for specific harvest data. Instead, the questions asked of hunters are used only to develop the harvest survey that is conducted after the season.

Bands that are recovered and reported by hunters are the source of information about survival and harvest rates, migration, and harvest derivation and distribution. A toll-free telephone number (1-800-327-2263) now provides an easy method for hunters to report bands. Following the phone report (hunters do not have to send in the band) hunters will be sent a certificate with specific information about the harvested bird's banding location, date, and age when banded.

Motion-wing Decoys (MWD):
Primary concerns associated with the use of motion-wing decoys (MWD) include potential increases in harvest, infringement on traditional methods, and issues of fair chase. Although several studies have shown MWD use results in higher success rates, it remains uncertain how MWD use affects overall harvest rates. Even if harvest rates are greater, the impact of hunting mortality must be kept in perspective relative to influences of habitat conditions and weather. During periods of high populations and favorable habitat conditions, the impact of harvest in general and hunting methods specifically may be relatively unimportant.

From a technical viewpoint, even if harvest effects are significant and lasting, regulation of hunting methods may not be necessary. As long as overall harvest rates are incorporated into hunting season considerations, the way ducks are taken is not necessarily an issue - from a biological perspective. It would be necessary, however, to determine whether hunters prefer more liberal opportunity (e.g. longer season) versus greater hunting success (e.g. using motion-wing decoys) if harvest impacts are significant and regulation changes are needed.

Some objections are rooted in issues of hunting tradition, learned skills (e.g. calling, blinds, choosing hunting locations, etc.), and public perception of hunters and hunting. These are valid concerns, although difficult to measure and incorporate into decisions. Undoubtedly, many hunting and fishing regulations are based on these types of concerns, which usually also have biological implications. Yet the ethical boundaries are poorly defined. A strong argument could be made in favor of hunting experience, tradition, and learned skills instead of another hunting gadget. An equally strong case could be made for enhanced hunting success as an attraction to novice and inexperienced hunters and a way to prompt or maintain interest in hunting and support for conservation.

Efforts to evaluate the use and attitudes regarding MWD were initiated in 2000 and continued in 2001. Field observations, reports from hunters on Department areas, responses to post-season surveys, and a waterfowl hunter attitude survey have provided insights into effectiveness and preferences for future use. Based on our initial work we found:

1) The use of MWDs affected duck behavior apparently leading to greater hunter opportunity and hunting success. When using a MWD hunters shot and retrieved 1.28 more total ducks per hunting party (2-3 hunters) and 0.82 more male mallards than when not using a MWD.

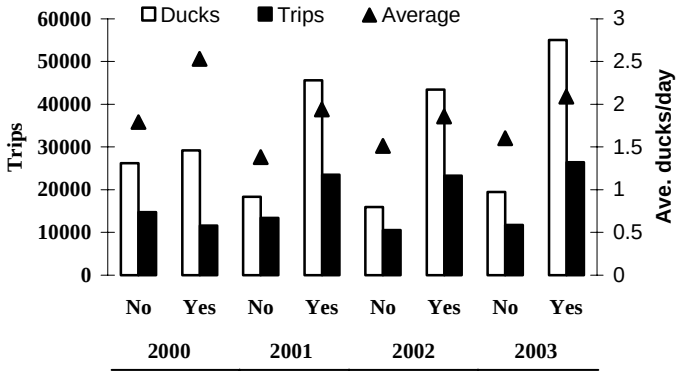
2) Missouri waterfowl hunters hunting on Department areas were more successful in 2000 when using MWDs than hunters who did not use MWDs. The overall difference in success rate between users and non-users was 0.78 ducks per hunter trip; however, about half of this difference was attributed to factors other than MWDs, such as greater hunting skills. The remaining increase in hunting success, between 0.32 and 0.45 ducks/ hunter trip (13%-19% increase in success rate), was attributed to MWDs.
3) The majority (83%, n=450) of avid Missouri waterfowl hunters surveyed (participants in zoning workshops) hunted over a MWD in 2000. Three-fourths reported MWDs to be more effective than regular decoys. Most hunters favored continuing use of MWDs as long as seasons are not affected; however, 20% opposed further use because of concerns about "fair chase" or loss of traditional hunting methods.
4) According to the waterfowl hunter attitude survey conducted after the 2001 season, a much greater proportion of avid hunters (67%) owned MWDs compared to novice hunters (20%). The majority of avid hunters (72% vs. 57% of novice hunters) indicated that MWDs were somewhat more or much more effective than hunting with regular decoys only. Avid duck hunters (63% vs. 47% of novice hunters) were in favor of the continued use of MWDs as long as season lengths or bag limits are not reduced. Less than 20% of duck hunters expressed concern about issues of fair chase or the impacts of MWDs on traditional hunting methods. Of those hunters who hunt on Missouri Department of Conservation wetland areas, 64% favored no special regulations on the areas, 19% felt they should be prohibited on Department areas, and the remainder believed they should be allowed only on certain Department areas, or in certain pools/units within areas.
5) In 2001, we noted that more successful hunters were the first to use MWDs. In 2001, we conducted additional analysis of Department wetland area data from the last 4 years and controlled for past combinations of hunting activity and use of MWDs. We looked at the differences in success between MWD users and nonusers who hunted on Department wetland areas for the first time in 2001. This group accounted for 24% of the individuals, 9% of the trips, and 7% of the ducks harvested with MWD users averaging 1.62 ducks per day and nonusers, 0.99 ducks per day. This result is noteworthy because inactive hunters represent the majority of waterfowl hunters. Small increases in success can represent substantial divergence from historical trends in harvest.
6) Hunters on Department areas who began using MWD increased their participation by about 1 hunting trip more than before using MWD.

2004 Motion-wing decoy update: The use of Motion-wing decoys in Missouri and throughout the country continues to be a source of controversy. Pennsylvania, Oregon, and Washington have prohibited their use and California and Minnesota have banned their use during a portion of the season. At the 2004 summer meeting, the Mississippi Flyway Council recommended that the USFWS summarize the results of existing studies on MWD.

MWD use and effectiveness: We have asked questions about MWD use the past 5 years in the Snow Goose Post Season Harvest Survey. Their use rose dramatically over a three year period and has continued to increase, but a much slower rate: 5,746 hunters (17%) in 1999, 14,570 hunters (43%) in 2000, 21,927 hunters (57%) in 2001, 21,743 hunters (58%) in 2002, and 21,175 hunters (67%) in 2003.

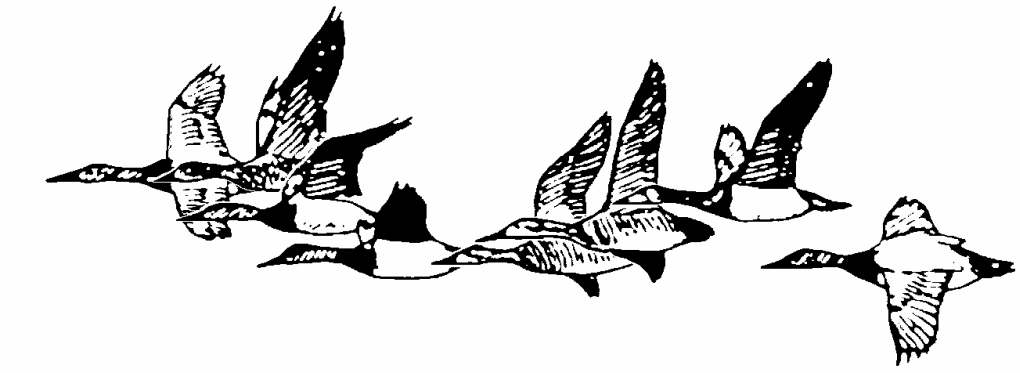
On Department wetland areas in 2000, MWD users accounted for 44% of the trips and 53% of the ducks harvested (Figure 14). By 2002, the percent of trips taken by MWD users jumped to 69% and the number of ducks harvested by MWD users increased to 73%. In 2004, the pattern of use and success remained almost identical with MWD users accounting for 69% of the trips and 74% of the harvest. MWD users averaged 2.09 ducks per trip compared to 1.6 ducks per trip for those who did not hunt with them in 2004. In each of the four years of this evaluation, the difference in success between MWD users and those who did not use them remained very similar.

Figure 14. Trips & ducks harvested on Department areas with & without MWD's, 2000-2003.



An increase in harvest can occur because of an increase in success rate and/or participation. The degree to which MWD added to the motivation for hunting is unknown. Regardless of differences in hunting activity and success among years of variable habitat, weather, and populations, the apparent influence of MWD was consistent and "significant." Additionally, a consistent increase in hunter success was measured among all Department areas in Missouri. Our conclusion is that MWD have a significant influence on hunting success and that the effect is sustained throughout the season and in subsequent years.

The implication of increased hunting activity and success with the use of MWD involves the potential effect of increased duck harvest rates. Increased harvest rates could lead to more restrictive seasons. Adaptive Harvest Management provides a framework for recommending duck hunting regulations based on predicted vs. actual harvest rates and duck populations. If harvest rates increase with use of MWD, the intended effect of restrictive season lengths and bag limits may be partially lost or poorly predicted. This should be considered as MWD use expands.



RECOMMENDING MISSOURI WATERFOWL SEASONS

Recommending the specific waterfowl seasons for Missouri involves hitting a "moving target" of migrations, weather, habitat conditions, and hunters' preferences. Undoubtedly, these variables again will play an important role in determining when and where waterfowling opportunities will occur in 2004. Sixty-day seasons for ducks in recent years have provided much more flexibility in season setting because a wide range of migrations and weather can be bracketed by the 2-month season. Additionally, 3 zones allow for a season tailored for the diverse hunting styles from North to South Missouri. A complete review of the long-term information used to recommend seasons was prepared for a series of zoning workshops held in spring 2001. This summary can be found on the Department's web page at:

http://www.conservation.state.mo.us/hunt/wtrfowl/migrations

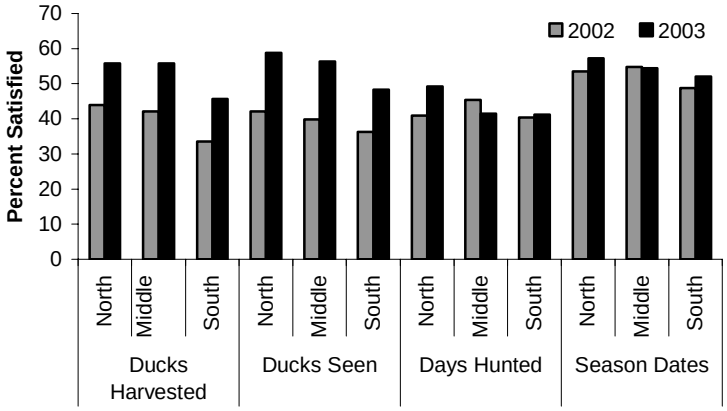
In Missouri, hunting prospects are determined by (in order of importance) 1) wetland habitat conditions, 2) weather, 3) migration timing, and lastly 4) size of the fall flight. Unfortunately, the most important variables are the least predictable, and the extremes of the last 5 years have been examples of the variation in weather and habitat that can affect waterfowl seasons. Hunters' attitudes about hunting season dates changed throughout this period as well. The predominant theme after mild seasons during 1997-1999 was for later duck season structure. This also was apparent during the zoning workshops that were held in spring 2001. Hunting season recommendations, however, must consider both short-term differences in hunter preferences in the context of long-term information about weather, migrations, and populations.

Duck Season Data for Missouri:
Considerable information is utilized each year when duck season dates are recommended for Missouri. Long-term trends of weather, migrations, and populations are the basis for duck season timing. **Weather** data, from selected weather reporting stations, include the temperature and precipitation affecting hunting conditions during September to January. **Migrations** of ducks have been reported on Missouri Department of Conservation wetland areas since 1948. Information about early-migrant dabbling ducks (teal, wigeon, pintails, etc.) and mallards both are considered when seasons are recommended. **Population** data from Department areas also are considered. These data, for both mallards and early-migrant dabblers, are the result of at least biweekly surveys conducted on each area since 1970. **Mallard band recovery** data provide a primary basis for information on the distribution of mallard harvest by location and date. Mallards are used because of their importance to Missouri hunters, annually accounting for 50%-70% of the statewide harvest. **Harvest** information from the U.S. Fish and Wildlife Service's post-season harvest survey provide a means to consider harvest levels for groups of years with similar zone/split season configurations.

The Role of Hunter Opinions:
Each year we use current information from waterfowl harvest surveys in addition to hunter contacts by phone and mail to gauge whether season timing is consistent with hunter attitudes about preferred dates to hunt. This year about 8,700 hunters received a Waterfowl Post-Season Harvest Survey and 11,000 hunters, a Snow Goose Post-Season Harvest Survey. Participants were randomly selected for each survey to ensure that we received the opinions of all types of

hunters.

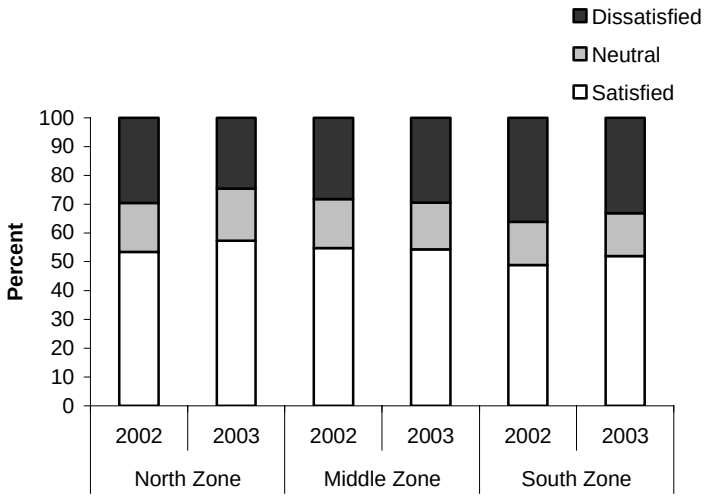
Figure 15. Hunter satisfaction by zone, 2002 & 2003.



Measures of Hunter Satisfaction:

Hunters were more satisfied with the number of ducks they viewed, the number of ducks they harvested, and the number of days they hunted than they were after the 2002 season (Figure 15). This change corresponds to increased duck numbers, higher harvest, and weather that afforded hunting opportunity throughout the 60-day season in Missouri in 2003 compared to 2002. Even though hunters had a 60-day season for the 7*th* consecutive year and Missouri had a record high harvest, over a third of Missouri duck hunters were dissatisfied with the number of ducks they harvested, the number of ducks they saw, and the number of days they hunted. Levels of dissatisfaction were the highest in the South Zone where 46% of hunters were dissatisfied with the number of ducks they saw and 41% were dissatisfied with the number of ducks they harvested.

Figure 16. Satisfaction with season dates, 2002 and 2003.



Hunters' Views about Duck Season Dates:

A several year trend of mild weather affected duck availability and, consequently, hunter preferences shifted to later hunting season dates. In response, beginning in 2001, the season opened the latest ever within a 60-day framework. In 2001, zone boundaries were also modified in two locations to accommodate the majority of waterfowl hunters in those areas. After 2001 hunter satisfaction with season dates has remained similar with about 50% of hunters indicating satisfaction with season dates (Figure 16).

Figure 17. North Zone – Week preferred to hunt ducks, 2001-2002 average & 2003.

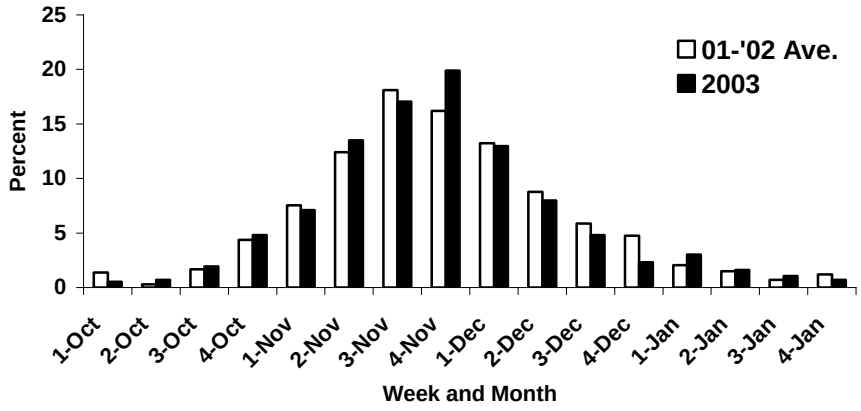


Figure 18. Middle Zone – Week preferred to hunt ducks, 2001-2002 average & 2003.

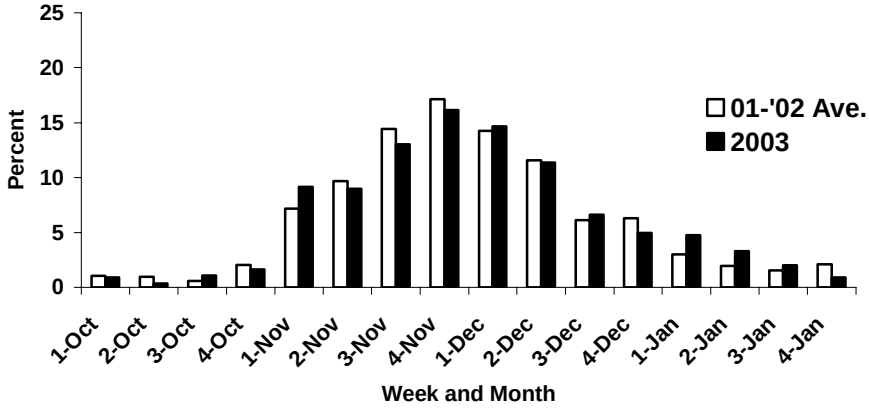
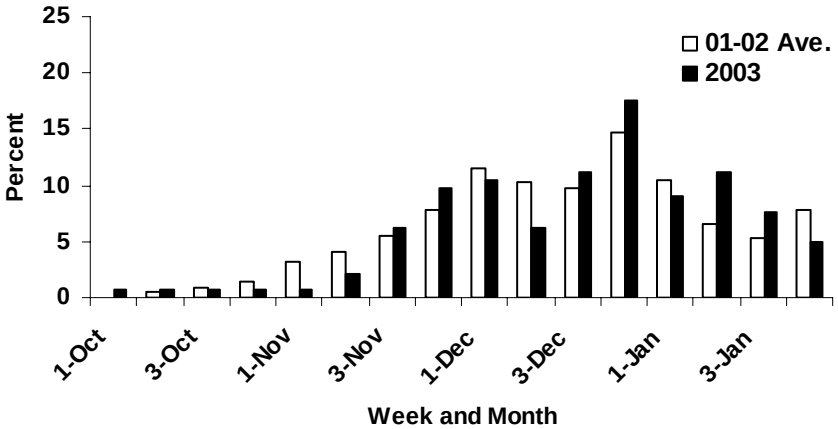


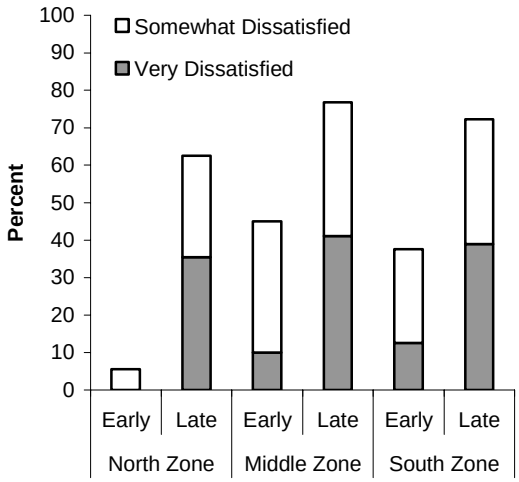
Figure 19. South Zone – Week preferred to hunt ducks, 2001-2002 average & 2003.



Year-to-year changes in hunting conditions result in annual differences of opinion. After an early freeze-up in 2000, hunters indicated earlier season preferences. After two years of relatively mild conditions, hunter opinions again shifted to late season preferences. Hunters were asked after each of the 1996-2003 seasons to indicate the week they most preferred to hunt ducks in the county they hunted most. In 2003, 58% of North Zone hunters indicated their preferred week to hunt ducks was in November, similar to 2002 (53%) and 2001 (56%) and down from 2000 (66%). Similarly, Middle Zone hunter preferences remained unchanged from 2002. Hunter preferences were the most widely

distributed in the South Zone where 19% of hunters preferred to hunt in November, 46% in December, and 33% in January. The proportion of South Zone hunters with a January preference has steadily increased since 2000 (21%, 26%, 34%, 33% in 2000, 2001, 2002, and 2003 respectively).

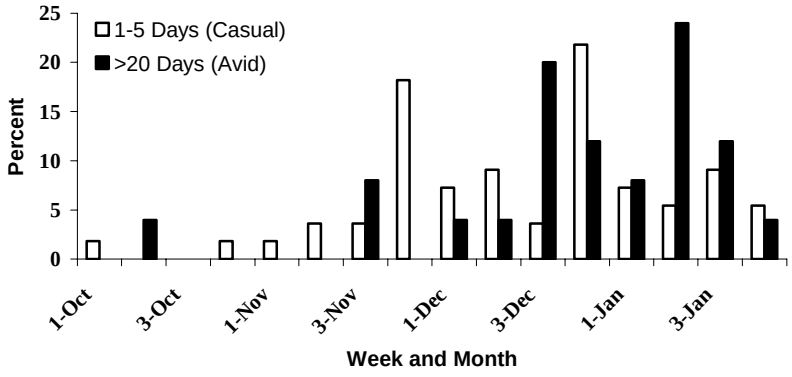
Figure 20. Hunter satisfaction with season dates by those with early & late season preferences.



Even in a 60-day season, not all hunters' preferred week to hunt can be accommodated. In 2003, 12% of North Zone hunters, 15% of Middle Zone hunters, and 18% of South Zone hunters indicated that their preferred week to hunt fell outside of the dates offered last year. Seventy-three percent of these hunters indicated their preferred week to hunt was later than last year's structure allowed. These hunters were also much more dissatisfied with the season dates than the hunters who indicated that their preferred week to hunt was before last year's season opened (Figure 20). In addition, most comments provided on the Post-season Waterfowl Survey pertaining to season dates were requests for later season dates.

All hunter preferences are legitimate; however, varied attitudes about the "best" season are not necessarily shared by all hunters even in a local area. Species preferences (mallards vs. other dabblers), habitat types (shallow, managed sites vs. reservoirs and rivers), and weather conditions (mild vs. severe) are just some of the factors that contribute to differences in views about preferred season timing. As a result waterfowl season dates always are points of contention.

Figure 21. Week preferred to hunt by avid and casual South Zone hunters, 2003.



Avid versus Novice Hunters: Avid hunters, the 12% who hunt more than 20 days per season, and novice hunters, the 46% who hunt less than 6 days per season, both must be considered when Missouri duck seasons are recommended. Their views, however, about preferred weeks to hunt are somewhat different. In the South Zone, for example, 31% of novice hunters' preferred week to hunt was in October or November compared to only

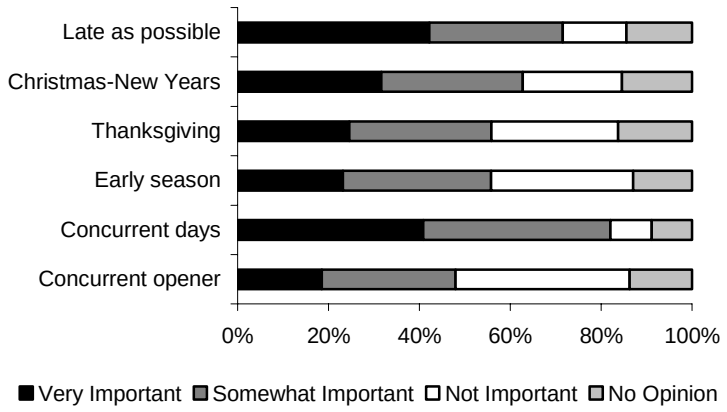
12% of avid hunters (Figure 21). In contrast, 48% of avid hunters versus 27% of novice hunters' preferred week to hunt was in January. The challenge is to provide seasons that encourage new and potentially future waterfowlers while maintaining involvement by experienced hunters.

Canada Goose Season Preferences:

While hunter input plays an important role in determining duck hunting season dates, they play a lesser role in regards to Canada geese. Population status of giant Canada geese and Eastern Prairie Population (EPP) Canada geese are the primary considerations. Giant Canada numbers are higher and more stable than EPP Canada geese and therefore can sustain greater harvests. Canada goose harvest management in the Mississippi Flyway is designed to maximize harvest opportunity for giant Canada geese without overharvesting EPP Canada geese and other interior Canada goose populations. States are allowed early season opportunity when only giant Canada geese are present and limited days after EPP Canada geese typically arrive. In Missouri, for example, we are limited to 30 days of Canada goose hunting after November 30 in the North, Middle, and Swan Lake zones. Goose hunters desire late season opportunity (72% indicated it was important to have the goose season open as late as possible); however, 56% of goose hunters indicated that it also was important to have early season opportunity.

Preferences for Canada goose hunting have changed dramatically since the 1980s. Increases in numbers of giant Canada geese, delays in migration of the Eastern Prairie Population, and changing distribution of geese in Missouri all have been responsible. Traditionally, hunters indicated a desire for concurrent duck and goose openers (73% in 1988 and 63.2% in 1996), but this has become less important (48% in 2002). In 2002, 82% of goose hunters still favored having at least some concurrent duck and goose days. We consider the timing of Thanksgiving weekend and Christmas/New Year's week and the need to control numbers of giant Canada geese (primarily through early seasons) as additional factors affecting goose season recommendations.

Figure 22. Goose hunter opinions of when goose seasons should be open.



Swan Lake Zone Elimination:

The Swan Lake Zone (SLZ) was established in 1962 to manage the harvest of EPP Canada geese that were associated with Swan Lake NWR during fall and winter. The number of Canada geese using the SLZ declined steadily since the 1970s, and by 1998, less than 5% of the statewide harvest occurred in the SLZ. Based upon the reduced harvest and low goose use, the Swan Lake

Zone no longer functions as a Canada goose harvest management zone. Therefore, we recommend that the Swan Lake Zone be eliminated for 2004. Delayed migrations and a wider distribution of EPP geese throughout the North and Middle Zones has required broadening EPP management considerations to also include the North and Middle Zones.

North and Middle Zone Considerations:

The week preferred to hunt Canada geese in the North Zone widely varied (22% prefer November, 35% December, and 40% January), reflecting preferences for early season giant Canada geese and late season migrants (Figure 23). In the middle zone, where fewer resident giant Canada geese are present, 46% of goose hunters' preferred week to hunt was in January (Figure 24).

Figure 23. North Zone – Week most preferred to hunt Canada geese.

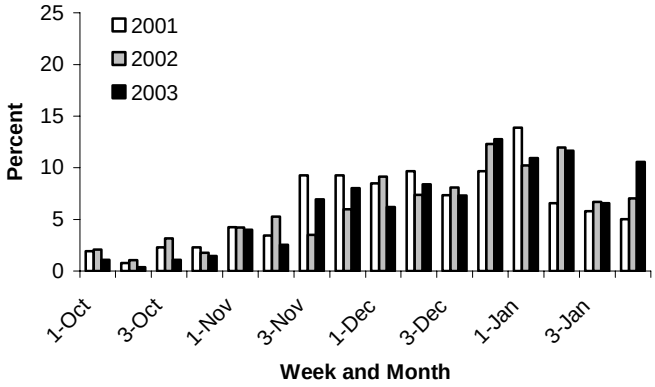
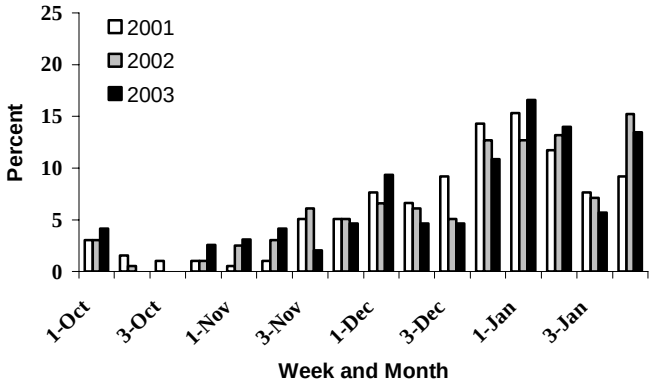


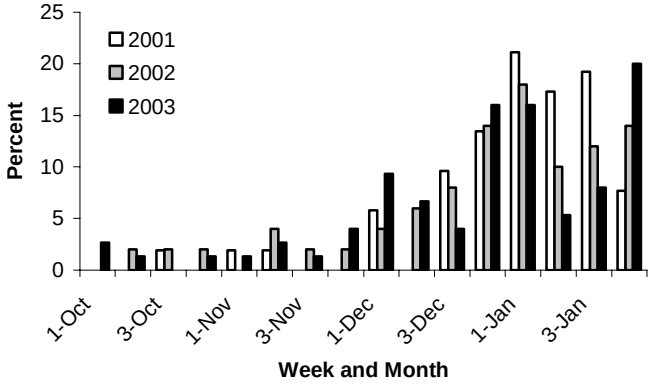
Figure 24. Middle Zone – Week most preferred to hunt Canada geese.



South Zone and Southeast Zone Considerations:

Delayed migrations and few resident giant Canada geese contribute to South Zone Hunters preferences for late season goose hunting opportunity. In 2003, 49% (vs. 54% in 2002) of South Zone goose hunters indicated that their preferred week to hunt was in January. South Zone goose hunters are also faced with a trade-off between Canada goose hunting opportunity and snow goose hunting opportunity through the Light Goose Conservation Order. Extending the Canada goose season later into January delays the opening of the Conservation Order. We included a question on the Snow Goose Post Season

Figure 25. South & Southeast Zone – Week most preferred to hunt Canada geese.



Harvest Survey to determine if South and Southeast Zone hunters preferred delaying the Conservation Order to provide additional late season Canada goose hunting opportunity. Only a small proportion of goose hunters in this zone specialize in hunting snow geese only and 88% of them opposed delaying the Conservation Order. Most goose hunters in the South and Southeast Zones hunt Canada geese only and 82% of them support delaying the Conservation Order to provide late Canada goose hunting opportunity. Similarly, 72% of individuals who hunt Canada geese and snow geese support delaying the conservation order.

Future Challenges:
Shorter seasons are inevitable when drought conditions occur and waterfowl populations decline. We expect shorter seasons will result in more disagreement about preferred season dates. However, the same suite of hunter survey data, including week most preferred to hunt and the week preferred for the season to open will provide guidance. Preferences for the opening week in a 4-week season provide indications of the "core" duck season. Based on our surveys of duck hunter preferences, the week most preferred to hunt is, on average, within 2 weeks of hunters' preferred times to open a 4-week season. In an 8-week season, the gap widens to just under 3 weeks in the North Zone and over 3 weeks in the South Zone. Hunters generally prefer later season opening dates in shorter seasons; however, there is much more disagreement about when the seasons should occur.

OUTLOOK FOR THE 2004 MISSOURI SEASON

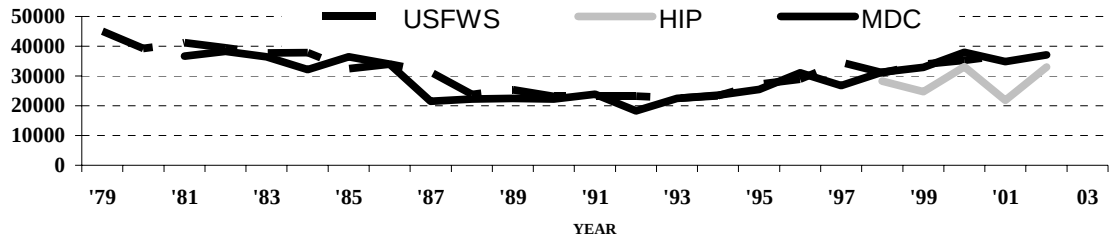
The outlook for 2004 is less optimistic than most recent years. News of dryer wetland conditions, lower breeding duck numbers and a reduced mallard fall flight, combined with prospects of a late spring and poor production in primary Canada goose breeding areas will undoubtedly lower hunter expectations during fall 2004.

Regardless of a decline in duck or goose numbers, there will not be a penalty in the number of days allowed. Missouri hunters will once again have a 60-day duck season and a 70 plus day Canada goose season from which to select their hunting days. Season dates should continue to provide the opportunity for a variety of hunting styles, including early and late season hunting preferences.

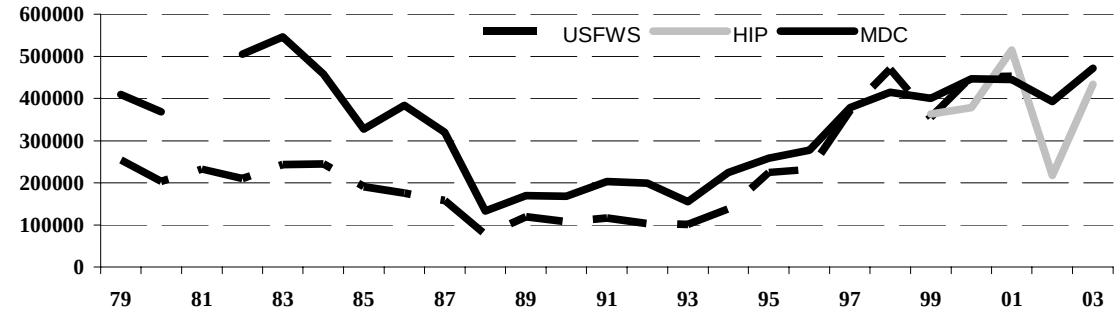
Area-specific conditions will affect local hunting prospects (Appendices F and G). A relatively mild summer with above average rainfall throughout most of the state has resulted in excellent growing conditions for native wetland plants that produce duck food. Except for flooding which could affect seed production in some locations, wetland habitat conditions appear to be favorable going into late summer.

Appendix A. Comparison of hunter and harvest estimates.

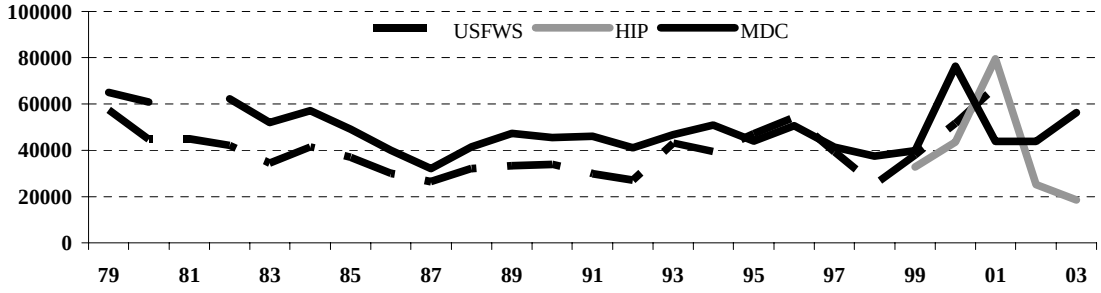
MO waterfowl hunter numbers: USFWS active waterfowl hunters, HIP estimate of duck hunters, and MDC estimate of duck hunters



MO duck harvest estimates:1979-2003 from USFWS, HIP, and MDC estimates



Missouri Canada goose harvest estimates:1979-2003 from USFWS, HIP, and MDC estimates survey



Appendix B. Waterfowl migrations, populations, habitat conditions, and hunting results by state/province in the Mississippi Flyway, 2003-04.

2003-04 Season Glance	HABITAT AND WEATHER	DUCK NUMBERS	DUCK HARVEST	GOOSE NUMBERS	GOOSE HARVEST	COMMENTS
AL	Favorable hunting conditions. Rain less than 2002 but above average. SAVs in reservoirs and bay above	+8.3% in Tennessee Valley and –72% in Mobile Bay area vs. 10 year average (1993-2002).	Projected slight improvement from 2002.	Lowest numbers on Wheeler Refuge since the 1940s (980).	Giant Canada early season was average.	
AR	Warm dry conditions. Very little rain until late Jan. NE AR had good habitat all year. Most of state very dry.	Aerial surveys about 50-70% below normal for most species.	Appears very low. Probably below 1,000,000. Many hunters quit mid-season	Snow/Ross much lower. White-front about average. Canada-low	Snow/Ross hunting activity high, should be good during Cons. Order period. Resident CG harvest was up.	3rd year of lower success. Stamp sales down 5% from last year, 10% down from 01-02
IL	Nov-mid Jan above avg. Late Jan below avg. Snowfall in north below avg. IL River poor moist-soil, except Chautauqua NWR.	IL River ducks 21% below avg. MS River ducks 16% below avg. Mallards: IL / MS river 32% above 2002 but 19% below avg.	26 public areas shot 73,162 ducks (438% > 2002). Hunter success 1.01 duck/hunter was 16%> than 2002 and near avg.	Large #s of CG remained in N. IL through Jan. S. IL did not exceed 65,000 until Jan. 30, but 140,000 on 2/3 in S. IL.	Three quota zones shot 52,000 CG or 72% of quota. N. Zone shut down 5 days early.	CG excellent North, poor South. Ducks avg. on state areas. No early freeze-up.
IN	Above normal amounts of rain and normal flooding for most of state. S. IN experienced extensive flooding in early Jan.	Duck numbers were low. Numbers increased as the season went on. Highest estimates were after season	Efforts were lower than last year, as was duck harvest.	Normal migration; small flocks in N. IN during late Oct. High #s mid-Dec. into early Feb.	Early season similar to 2002. Reg. season similar to past few years.	Hunter concerns over ducks/geese arriving towards season end. .
IA	Dry Sep., Oct. water levels below normal. North ½ IA froze Nov. 2-9. State froze early Dec.	Major migration Oct. 27-Nov. 9 was avg. Most through by mid-Nov., and most in west 1/3 of IA.	Should be near average.	Normal Oct/Nov. Large migration last week in Nov. High #s mid-Dec into Jan.	Similar to past few years which is above avg. for the 1990s.	Good Sep. split of duck season, poor 2nd opener. Ducks done by 11/10.
KY	Nov-Jan temps extremely variable. Heavy spring floods meant poor/ fair moist-soil crops.	#s 25-45% below avg. through mid-Dec., early Jan. lowest since '98. Ducks peaked 3rd week Jan.	Good early, fell sharply thru Dec., good late. Expect avg. or slightly below.	Migrant CG peaked after season. WF #s highest reported in western KY.	CG will be slightly below avg., with focus on locals. WF harvest above avg.	CG goose hunters requesting 2/15 closing date in W Zone.
LA	Precipitation & temp near normal. Habitat good in coastal zone, dry in north LA.	Aerial surveys well below avg., except Midwinter count was avg. with 3.4 million.	Harvest similar to last year's poor season. Better 1st split. Mallards down, teal up.	WF, SG/Ross above last year, but below 5 year avg., Light geese arrived late, left early.	WF hunting good, light goose harvest higher; more effort due to poor duck success.	Third year with reduced duck hunting success. There is a growing concern.
MB	No report					
MI	Wet spring, dry summer and early fall. Fall / winter weather normal, lots of snow in Jan.	Spring production average. Fall teal and wood ducks #s good, mallard #s lower.	Moderate harvest. GWT abundant all fall. Mallard harvest lower than 2002.	Production appeared avg. Good #s of CG through fall, esp. late Oct. and early Nov.	Early season similar to 2002. Reg. season higher and late season lower.	Growing concern over declining MI mallards since 1998.
MN	Dry conditions all fall. Excellent wild rice. Warm Oct., cold and freeze-up early Nov, mild Dec.	Populations down, but above long-term avg. Moderate #s in Oct and Nov.	Good opener, poor to fair in Oct. Expect smaller or similar harvest to last year.	Resident Pop. 304,000. EPP fall numbers fair. 80,000 CG during Jan. Midwinter count.	Sep. harvest 81,000. Reg. season avg., good Dec. Overall, similar to last yr.	Spinning-wing ban 1st 8 days. 119,000 state stamps sold. Poor diver hunting.
MS	Dry conditions all fall. Rain and cold weather arrived after the season ended.	Duck #s low early, increased as the season went on. Highest estimates were after season.	Opening weekend was good. The remainder of the season was poor.	Fair to good reproduction of resident geese.		Hunter concern of three bad years of duck numbers in MS.
MO	Early season dry and warm, but above avg. precipitation and colder temperatures improved conditions late season.	Duck numbers above avg. and above last year but within historic range.	Record high harvest on public areas. Above avg. harvest expected overall.	Low #s CG early but improved during Jan. Good #s of light geese through Dec., low #s in Jan.	Average CG harvest but above last year. Snow goose harvest similar to last year	Timely migration events and open water ensured hunting opportunity throughout season.
OH	North cold with early ice, South had extensive flooding in Dec./Jan.	Migration surveys indicated below normal concentrations throughout season	Widely mixed across state, and largely relegated to mallards in S. Controlled hunts above avg.	#s below normal until mid Jan., higher #s in Feb. Overall, below normal.	CG hunting slow in North, fair in South.	Mixed hunter success.
ON	No Report					
TN	West TN crops good. Rest of state poor. Weather warm.	Down 48% from 94-03. Down 26% from 2003	Very poor, maybe worst in history	CG down from avg., WF and SG up.	Very poor	Birds acted like old, educated birds.
WI	Dry early, some Nov. rain. Early Oct. cold, warm rest of month. Good wild rice. MS River better.	Total Spring population and mallards down from 2002, but above long-term avg..	High expectations but not realized. Overall expect lower than 2002 harvest.	Spring resident #s highest ever at 235,000. Fall #s and flights into Horicon good.	Early season down. Reg. CG season harvest 73,441, 14% below allowable.	

Appendix C. Mean mallard harvest/day by 5-day periods among years of similar zoning structure, 1973-2003.

	October			November						December						January				
	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5
Mallards																				
1973-76			3915	3707	4166	3560	2202	2853	2848	1875	2471	2137	2813		1873	712				
1977-79			1699	2402	3188	3856	3810	3562	2260	2391	1412	679	625	100	166					
1980-82	1715			3472	2750	2100	2412	2552	2228	1705	1520	2254			518		143			
1983-85	913	1151		3628	2873	2421	2055	3331	2683	2339	1521	1379	461	343	461	319				
1986-90				3814	2447	1532	1877	1856	2008	1512	1946	317			146	56	130	0		
1991-94			1382	1437	2277	1675	1520	1541	1844	1085	530	174	100	108	94	215				
1995			1717	5492	3001	2012	2146	1956	2462	1256	2104	873	1339	278	277	330	0			
1996			1438	2286	1705	1783	2116	2291	2316	3807	1187	740	781	521	261	600	541	971		
1997		1313	1077	1536	2834	4323	2884	2013	2372	2942	2476	2915	2927	1358	1315	0	926	2157		
1998		1528	812	451	1862	5378	3623	3519	3658	1723	3347	1438	1391	613	911	406	584			
1999		962	532	2046	1337	648	1295	2779	2299	4444	4493	5496	5141	1699	1847	859	1115	513		
2000			1004	2912	5801	6707	6160	6440	4903	2545	2207	2344	1252	990	352	338	1429	1447		
2001			1898	1827	2850	1699	2918	5939	9313	4772	4357	5009	6091	6575	1556	424	236	1175	507	
2002 *			659	3060	1204	1304	1341	2682	3439	3576	1994	1616	1547	1582	802	344	344	34	0	516
2003 *		115	1262	6215	7080	2871	2911	4838	4209	2868	3404	2103	5124	3174	2868	118	197	197	669	

*preliminary

Appendix D. Mean total duck harvest/day by 5-day periods among years of similar zoning structure, 1973-2003.

	October			November						December						January				
	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5
Total Ducks																				
1973-76			11918	8037	6529	5348	3204	3839	3448	2334	3269	2588	3203		2202	712				
1977-79			6068	5683	5990	6111	5874	5486	3177	3628	1903	804	798	167	249					
1980-82	8049			7630	4836	3334	3441	4107	2989	2309	2001	2541			609		175			
1983-85	5609	8500		9604	5826	3948	3628	4529	3716	3089	2080	1637	592	619	834	319				
1986-90				8157	4734	2709	2941	2985	2415	2175	2710	492			191	129	155	0		
1991-94			3673	3596	4487	3213	2455	2330	2661	1477	829	268	124	130	183	441				
1995			5761	11516	5070	3924	3072	3720	3709	1582	2856	1068	1634	660	436	361	0			
1996			5317	6968	4648	3958	4442	3616	3850	4466	1737	1317	1479	667	261	820	923	1618		
1997		7661	4256	6064	8475	11054	6899	3814	4618	4418	4330	4305	3390	2097	2348	91	1117	2613		
1998		10355	7650	4168	7139	13601	9296	7684	6695	3336	5687	2532	3599	1751	4032	1103	1029			
1999		5763	3583	3965	3709	1948	3012	4874	4264	7144	7386	8267	7609	3104	2690	1010	2150	513		
2000			4172	10593	12508	11078	10510	11898	6935	4696	3948	3284	1518	1677	668	395	1992	2183		
2001			4426	6424	5120	3644	4105	9393	12632	6142	5784	7357	7553	8538	3460	1546	444	1998	972	
2002*			3152	8459	2888	2407	1926	3851	4711	4573	2957	1857	1788	1891	1003	378	378	34	0	516
2003*		6293	1409	14003	13610	5467	5546	8221	7237	4209	4523	3540	7001	4602	3180	275	236	511	747	

*preliminary

Appendix E. Mean wood duck harvest/day by 5-day periods among years of similar zoning structure, 1973-2003.

	October			November						December						January				
	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5
Wood Ducks																				
1973-76			2320	1039	419	366	58	134	29	0	53	0	0		0	0				
1977-79			1342	761	279	371	161	137	10	81	29	0	0	0	0					
1980-82	2567			1246	891	403	202	152	50	65	64	0			0		0			
1983-85	2299	2593		1288	359	261	129	206	74	84	44	11	0	0	0	0				
1986-90				1178	455	174	127	129	93	56	0	0			0	0	0	0		
1991-94			954	662	500	318	165	138	95	42	40	1	0	0	7	0				
1995			1468	589	290	448	222	316	98	66	0	0	0	0	0	0	0			
1996			871	411	468	203	261	171	129	0	102	324	37	0	0	0	0	0		
1997		3054	398	615	301	361	29	76	59	0	0	0	76	76	0	0	0	0		
1998		2411	1380	902	1295	1383	287	518	116	56	50	0	231	65	108	0	0			
1999		2703	1236	683	536	494	571	0	176	103	494	150	77	0	0	0	26	0		
2000			729	1316	445	228	148	57	42	0	161	0	0	57	0	0	113	0		
2001			414	872	253	166	0	167	197	114	121	42	129	0	139	0	0	0		
2002*			229	550	103	69	34	103	172	34	0	0	0	0	0	0	0	0		
2003*		1377	328	983	944	590	393	157	0	118	157	0	39	0	0	0	0	0	39	

*preliminary

2004 Status of Missouri wetland areas (September 15, 2004)

AREA	REPAIRS AND CONSTRUCTION	HABITAT/FOOD STATUS			Water Management	HUNTING PARTIES PER DAY	
		Moist-Soil	Timber	Floodable Crops		Blind	Walk-in
Nodaway Valley	None	Excellent	NA	Good	Normal	4 blinds, (1 disabled)	15 plus 150 acre open area
Bob Brown	None	Good	NA	Excellent	A shortened MO River navigation season could result in reduced pumping capabilities	1 disabled	4-9 (low river) 19 – 20 (normal riv)
Fountain Grove	None	Poor/Fair	Fair	Fair	Normal	14-26	7-16
Swan Lake	None	Good	NA	NA	Normal	12	10 field hunting spots
Grand Pass	None	Good	NA	Excellent	A shortened MO River navigation season could result in reduced pumping capabilities	None	10-15 (low river) 20-45 (norm. riv.)
Eagle Bluffs	None	Excellent	NA	Excellent	A shortened MO River navigation season could result in reduced pumping capabilities	2 disabled	15-20 if normal river levels
Upper Mississippi	None	Fair	Poor	NA	NA	99	Opportunistic
Ted Shanks	None	Excellent	Fair	Very Good	Normal	16(1 disabled)	20-30
B.K. Leach	South addition closed for construction	Good/Exc	Fair	Fair/Poor	Normal	7 (1 disabled)	3
Marais Temps Clair	None	Good/Exc	NA	Fair/Good	Normal	1 disabled	5-8
Schell-Osage	None	Excellent	Good/ Exc.	None	Normal	20	12 Parties- Rain Dependant
Montrose	None	Fair/good	NA	None	Normal	15	none
Settles Ford	None	Good	NA	Poor	9/14 have water 5 pools – water in borrows	1	Opportunistic
Four Rivers	None-Unit 4 repairs completed!	Fair/Exc.	NA	Fair/Good	Managed-Normal Open-below normal-rain/flood dependant	1 disabled	22-30 plus open areas
Duck Creek	None	Excellent	Fair	Fair/Good	Pool 1: Extremely low Pool 2: Dependent upon rainfall, to be flooded as soon as possible Pool 3: Dependent upon rainfall, to be flooded after tree growing season	8 blinds (2 disabled) 3 pits	3
Otter Slough	None	Excellent	NA	Good	Normal	10 (1 disabled)	17-20
Ten-Mile Pond	I Pool	Excellent	NA	Excellent	Normal	0	12
Coon Island	None	Fair	Good	Poor	Normal	0	Open Hunting
Little River	Potential bridge construction may cause closure of northern units	Fair	NA	Poor/Fair	Normal	0	3

2004 Teal season - Status of Missouri wetland areas (9/3/04)

Conservation Area	Drawing	Repairs	Habitat/Food Status	Teal Season*	
			Moist-Soil	Acres Flooded/ Wetland Status	No. Hunters
Nodaway Valley	No	None	Good	150acres in hunting pools, 50 acres in teal refuge	No Limit
Bob Brown	No	None	Good	150 acres	No Limit
Fountain Grove	Opening Weekend	None	Poor	400	25
Grand Pass	No	Pool 6 and 7 Maintenance will delay flooding	Good to Excellent	150	No Limit
Eagle Bluffs	Yes in A.M. No in P.M.	None	Good	400	24 parties & 2 disabled blinds
Upper Mississippi	No	None	Fair	--	--
Ted Shanks	No	None	Good	700	No limit
B.K. Leach	No	South addition closed for construction	Very Good	50-75	No limit
Marais Temp Clair	As Needed	Pool 3 levee repairs	Very Good	75	About 10
Schell-Osage	No	None	Excellent	200	No limit
Montrose	No	None	Fair/Good	Lake area	No limit
Settles Ford	No	None	Good	340	No limit
Four Rivers	Opening day for Units 1 & 2.	Units 1 and 2: Drainage modifications will delay pumping	Fair to Excellent.	Draw Areas: Unknown – call for updates Open Areas: 600	Draw Areas: Unknown Open Areas: Unlimited
Duck Creek	Draw on weekends for Unit A	Pool 1 water level low	Excellent	600-800 Pool 1 Unknown as of now Unit A	No Limit Unknown until flood up/ week before season
Otter Slough	Yes	None	Excellent	500	18-20
Ten-Mile Pond	No	None	Excellent	75-100	No limit
Coon Island	No	None	Fair	250	No limit
Little River	No	North side inaccessible	Fair	75	4